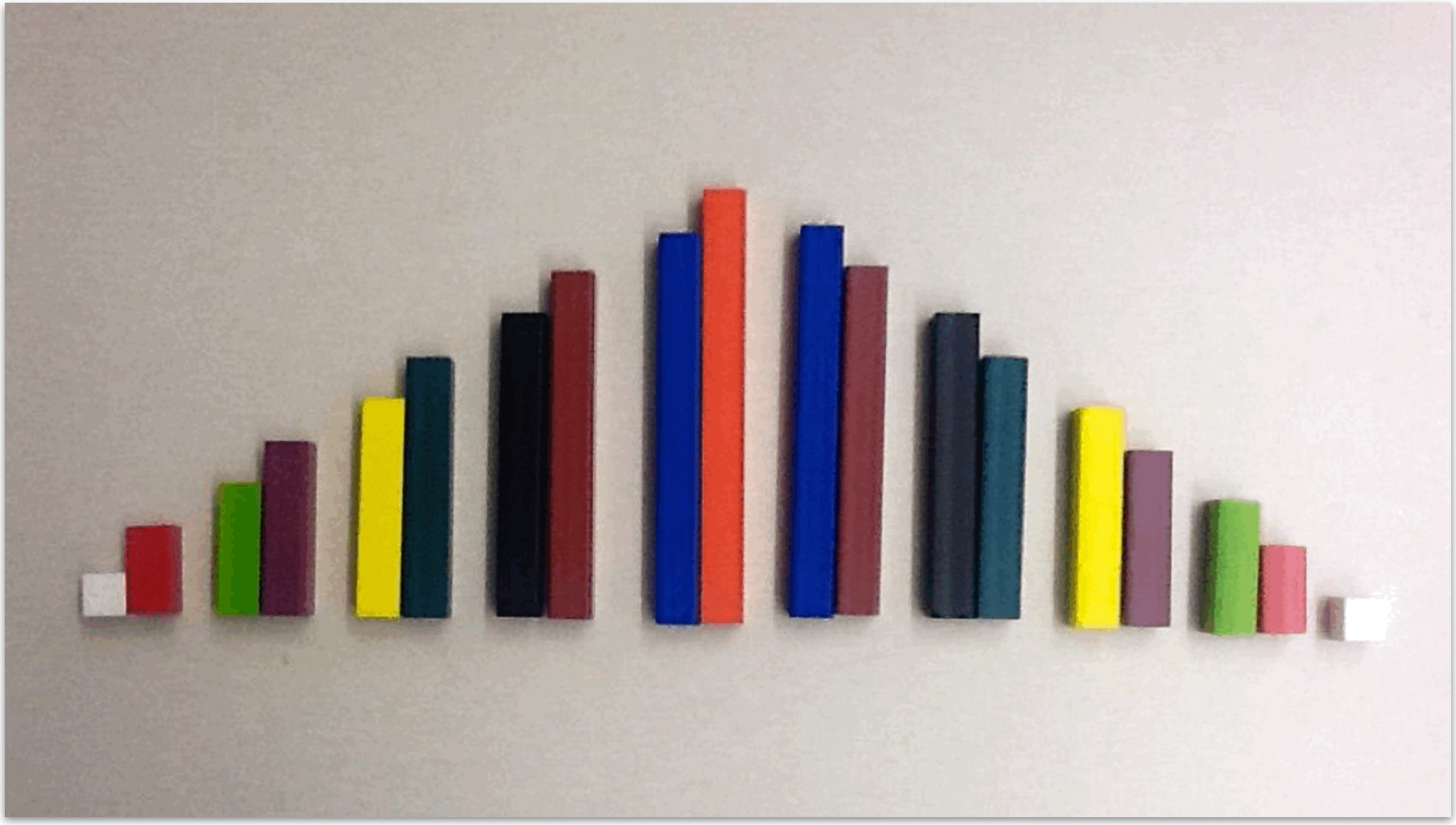

Conceptual Understanding Through Cuisenaire Rods

Surrey Focus Day • February 2020

Chris Hunter

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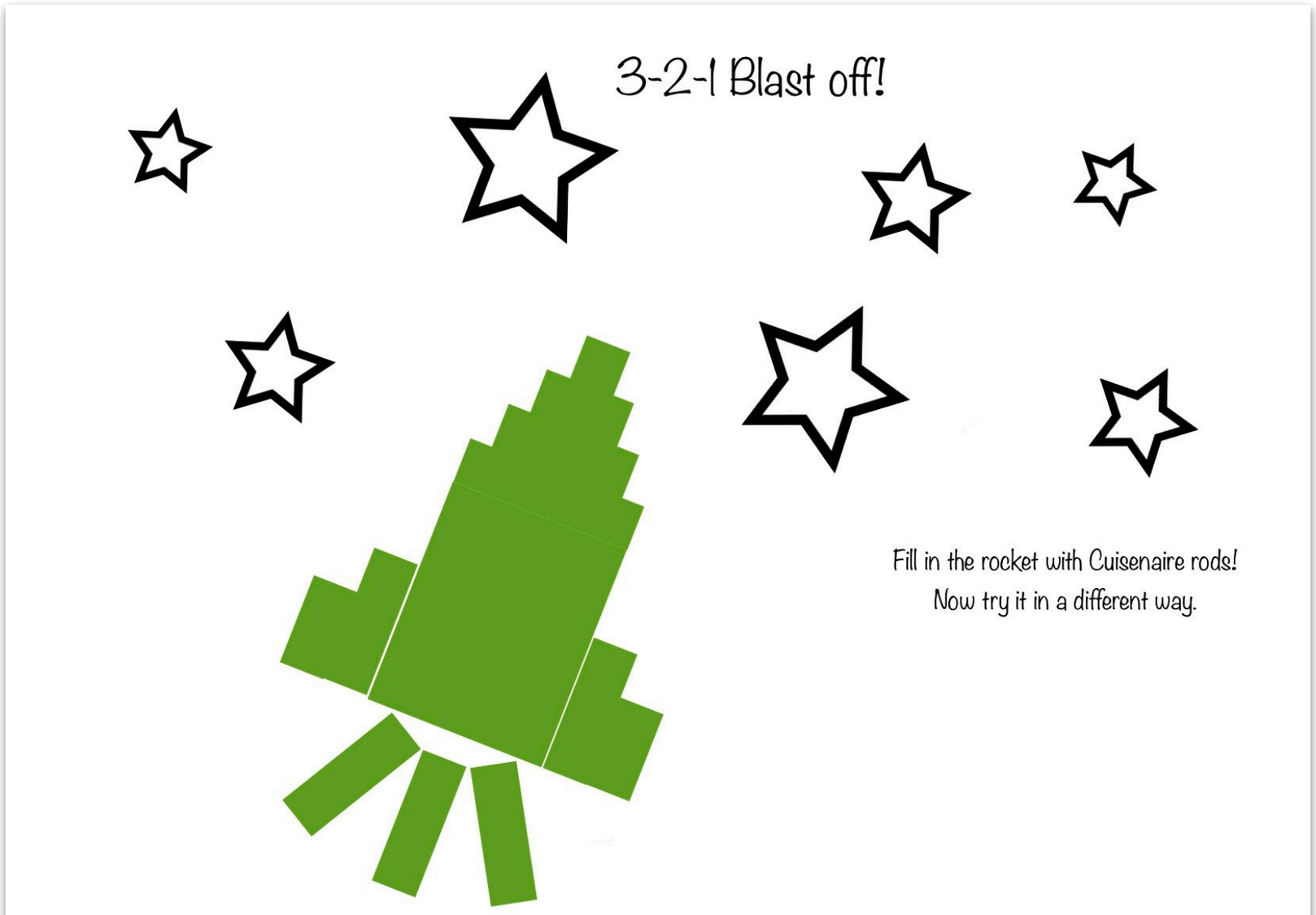
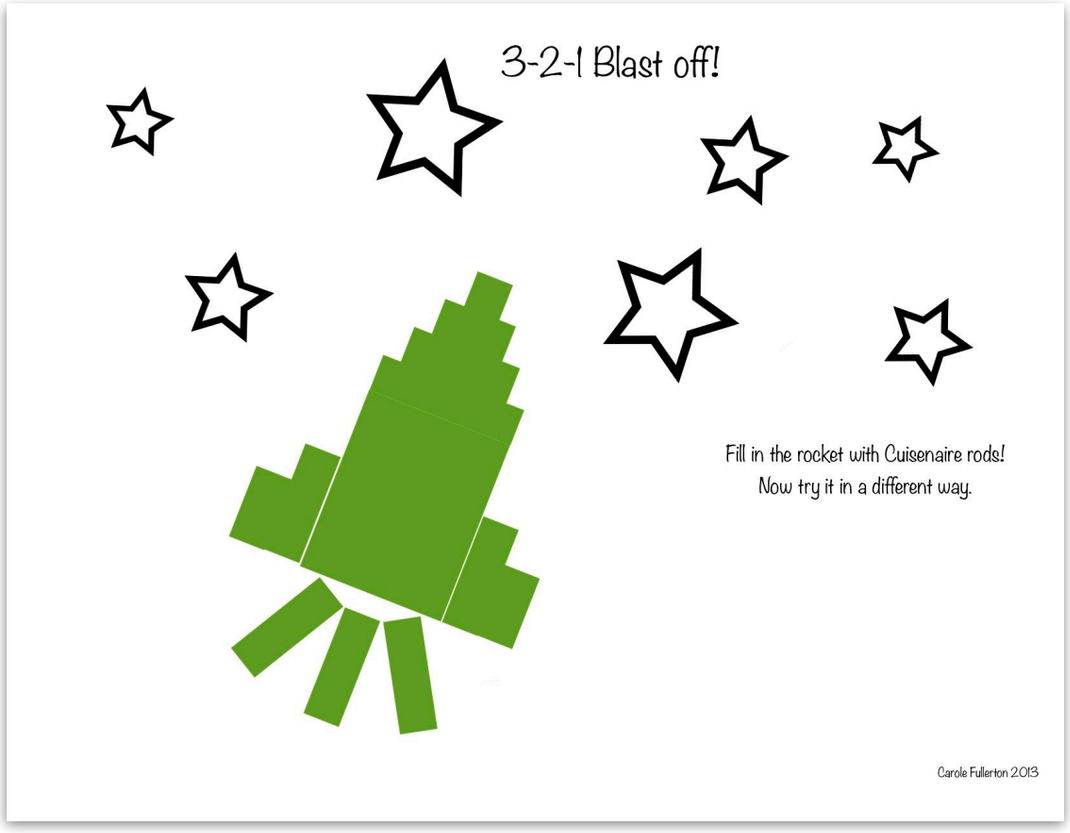
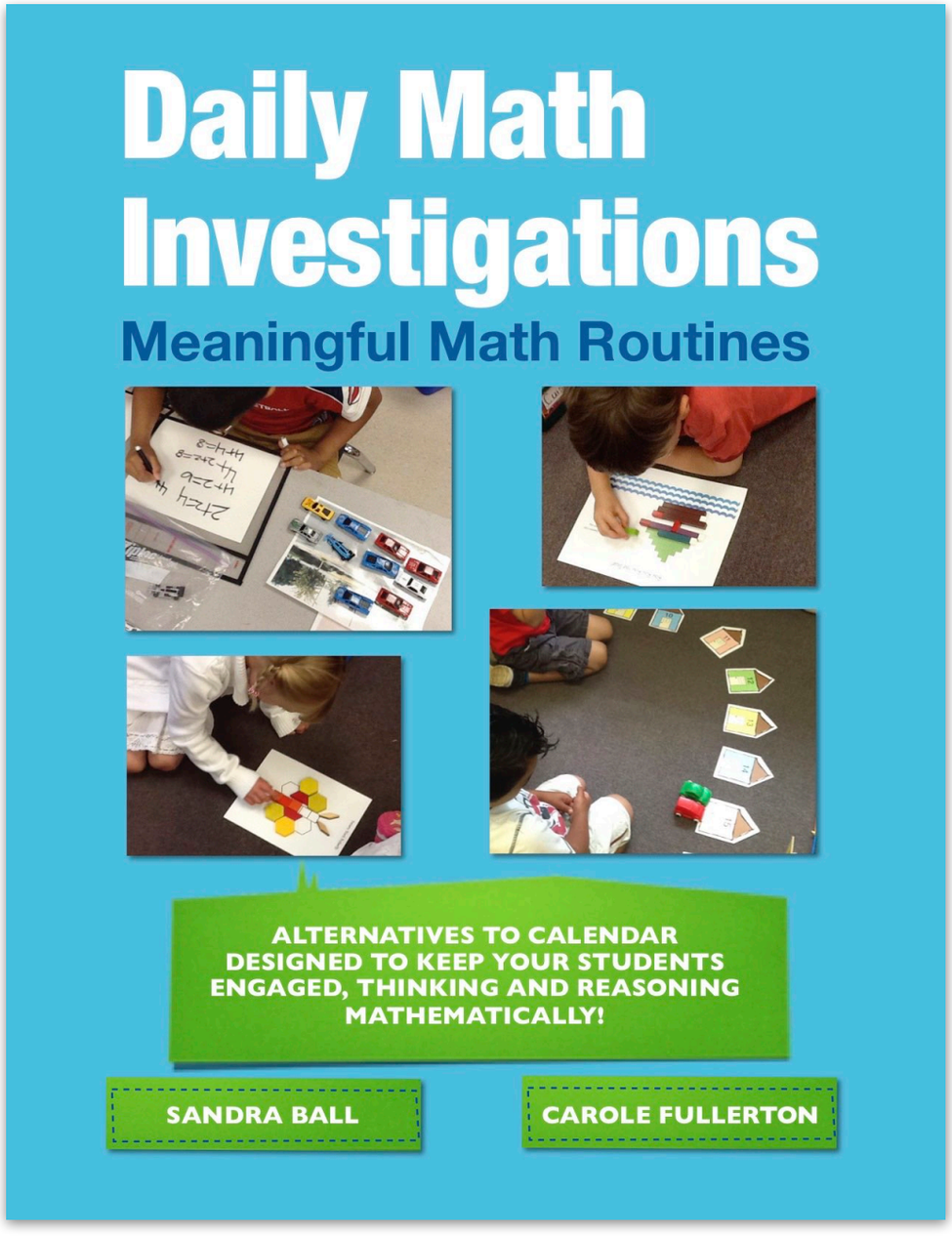
reflectionsinthewhy.wordpress.com

Spatial Puzzles

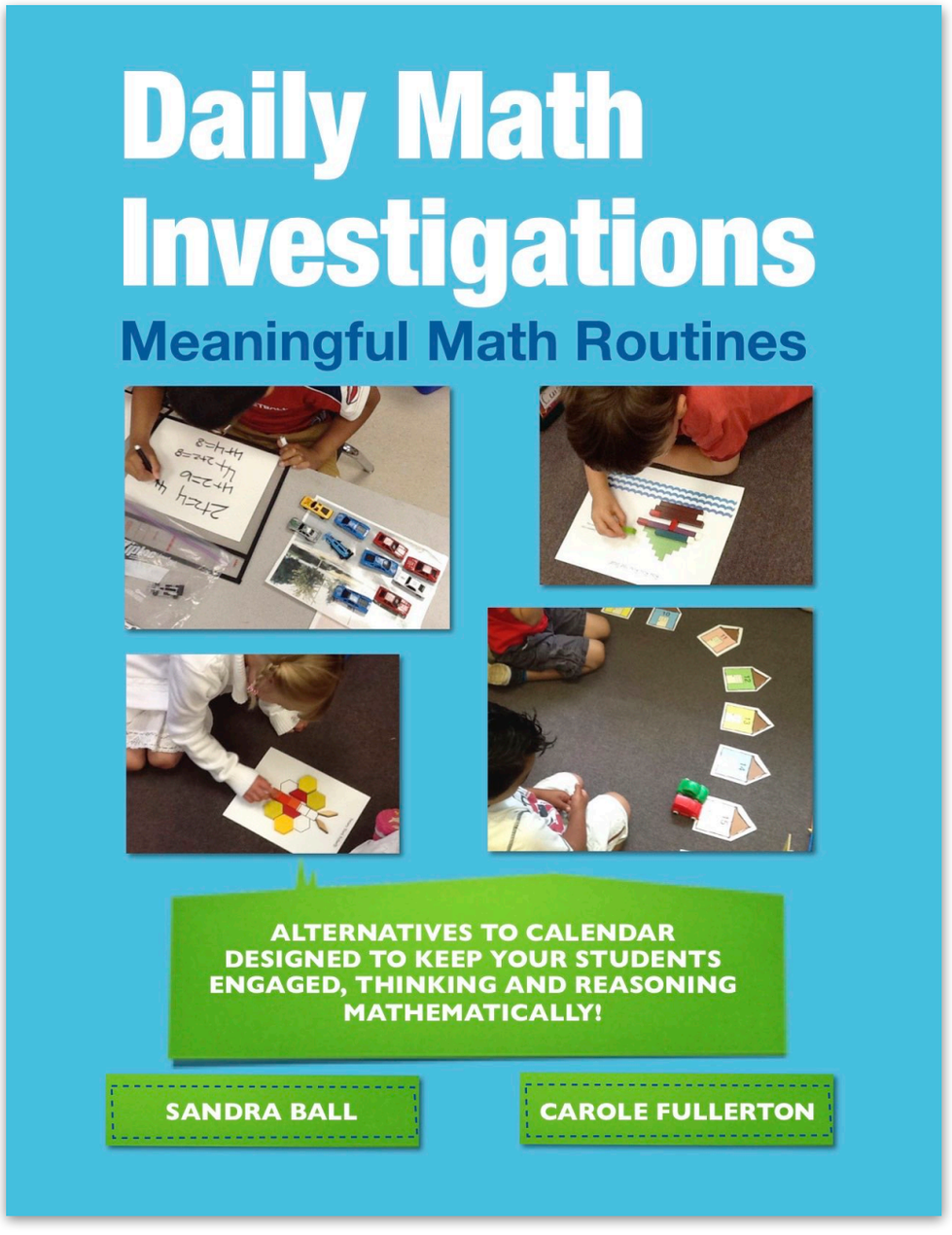


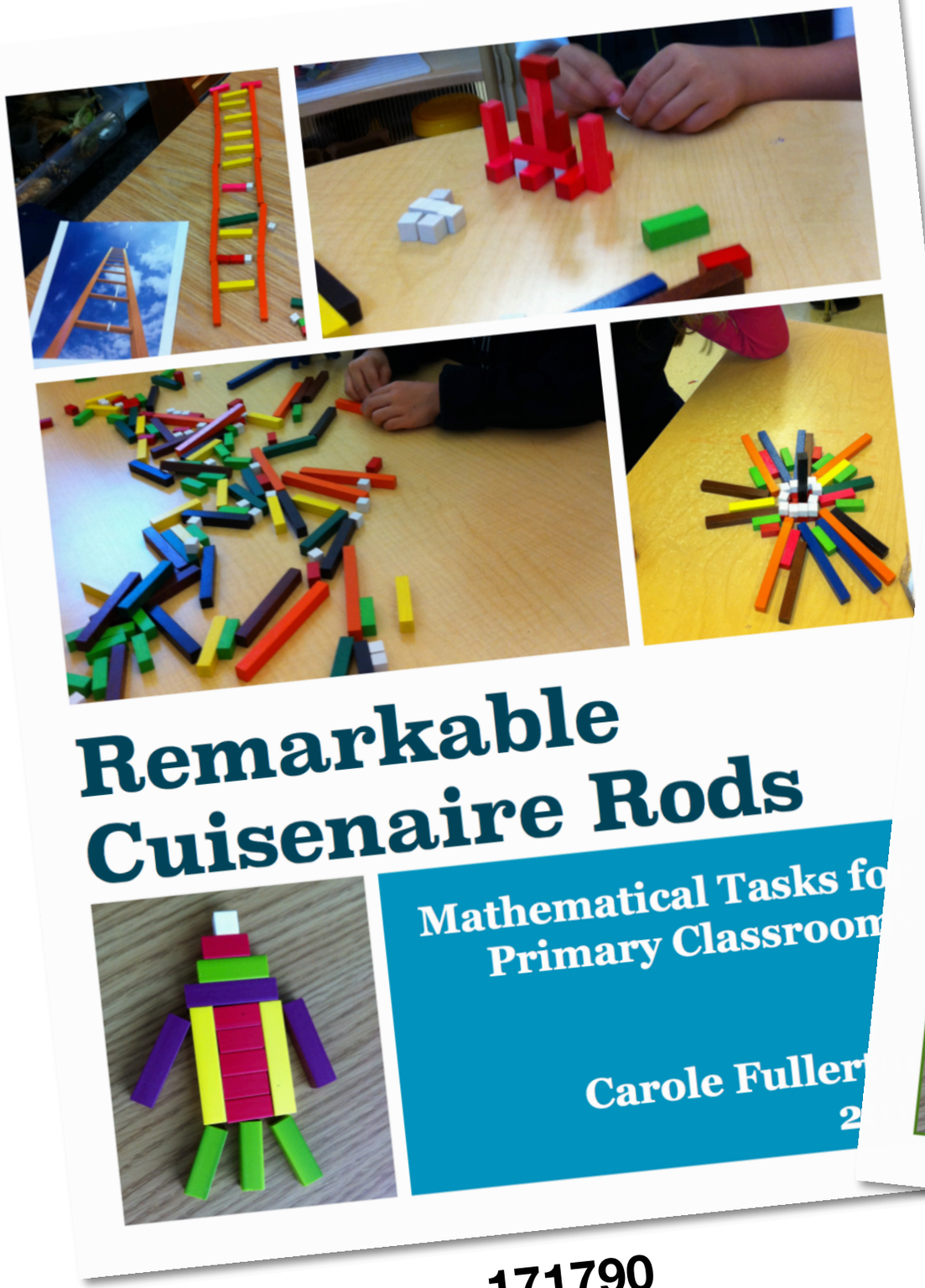
Spatial Puzzles



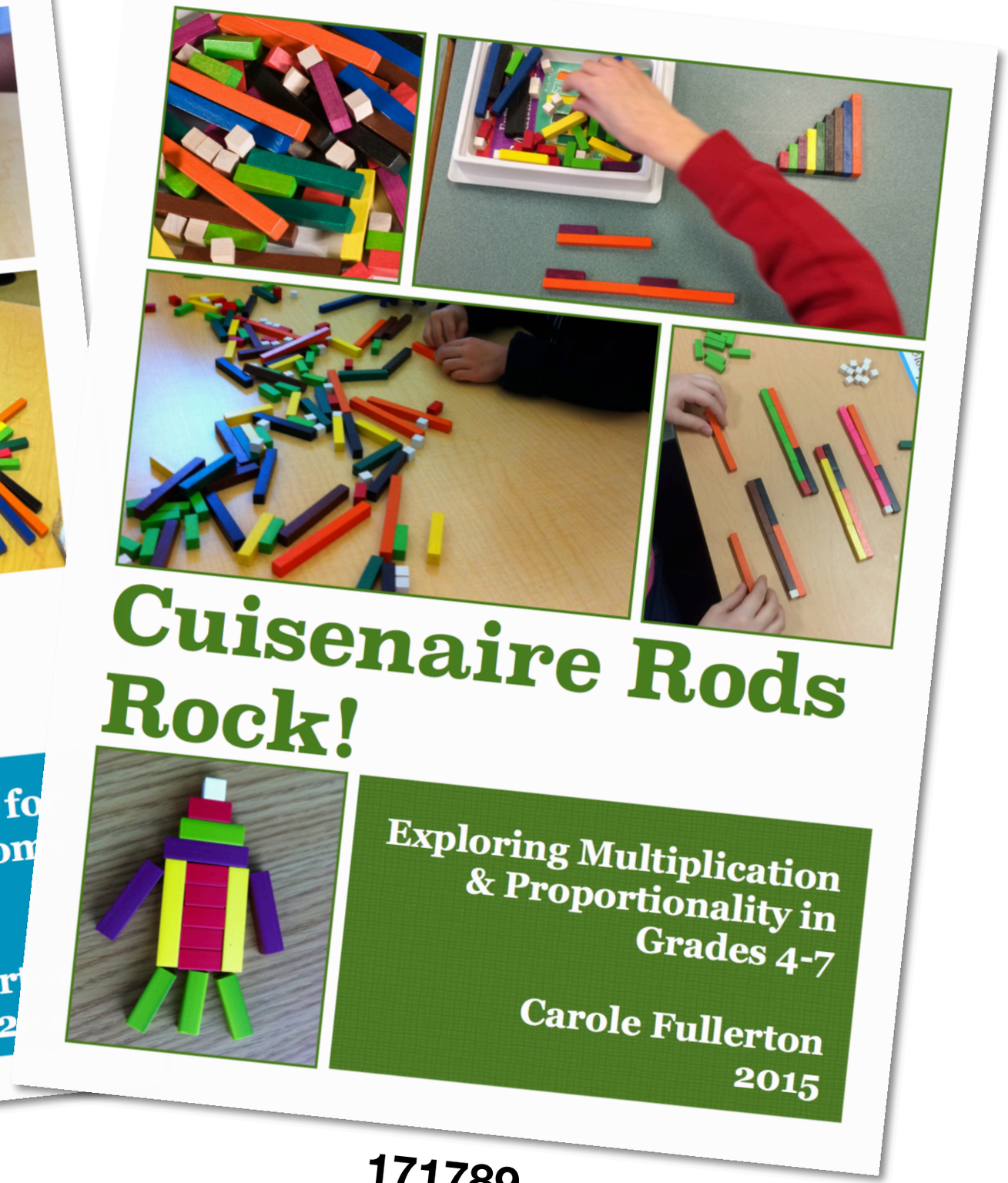


Spatial Puzzles





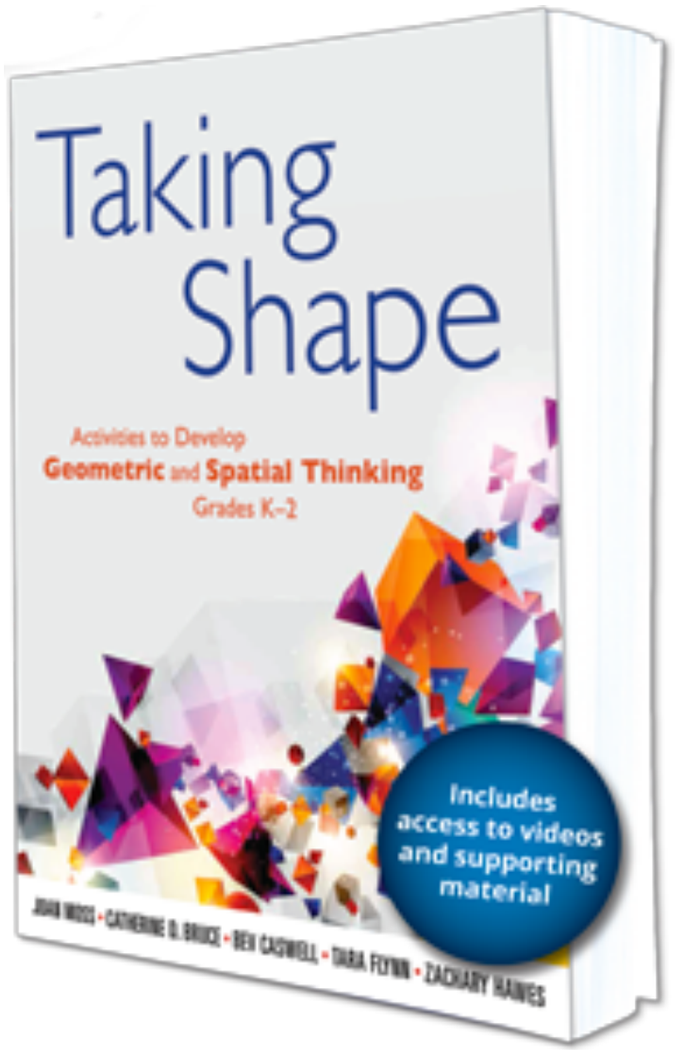
171790



171789

Spatial Thinking

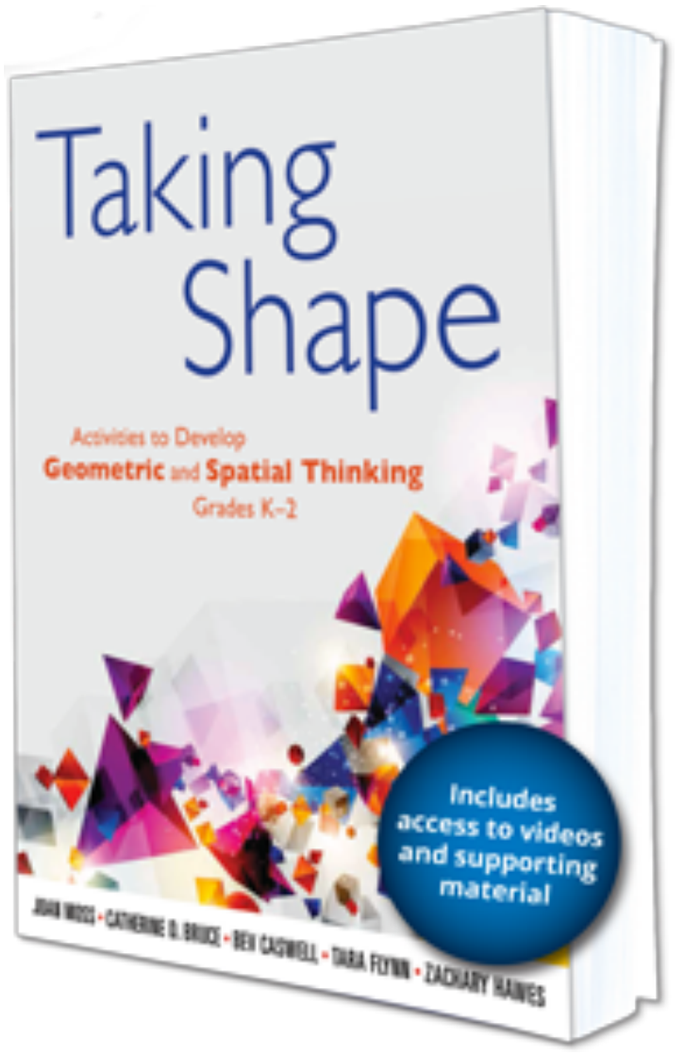
"Just as experiences **composing** and **decomposing** **numbers** are important for the development of children's **number sense** […], it is important for children's **understanding in geometry** that they experience **decomposing** a **shape** into small parts and **recomposing** those parts into a whole.



174344

Spatial Thinking

The ability to **predict** what shape is made when geometric shapes are put together to form a new and composite shape is the beginning of a **strong foundation for future success in geometry**."



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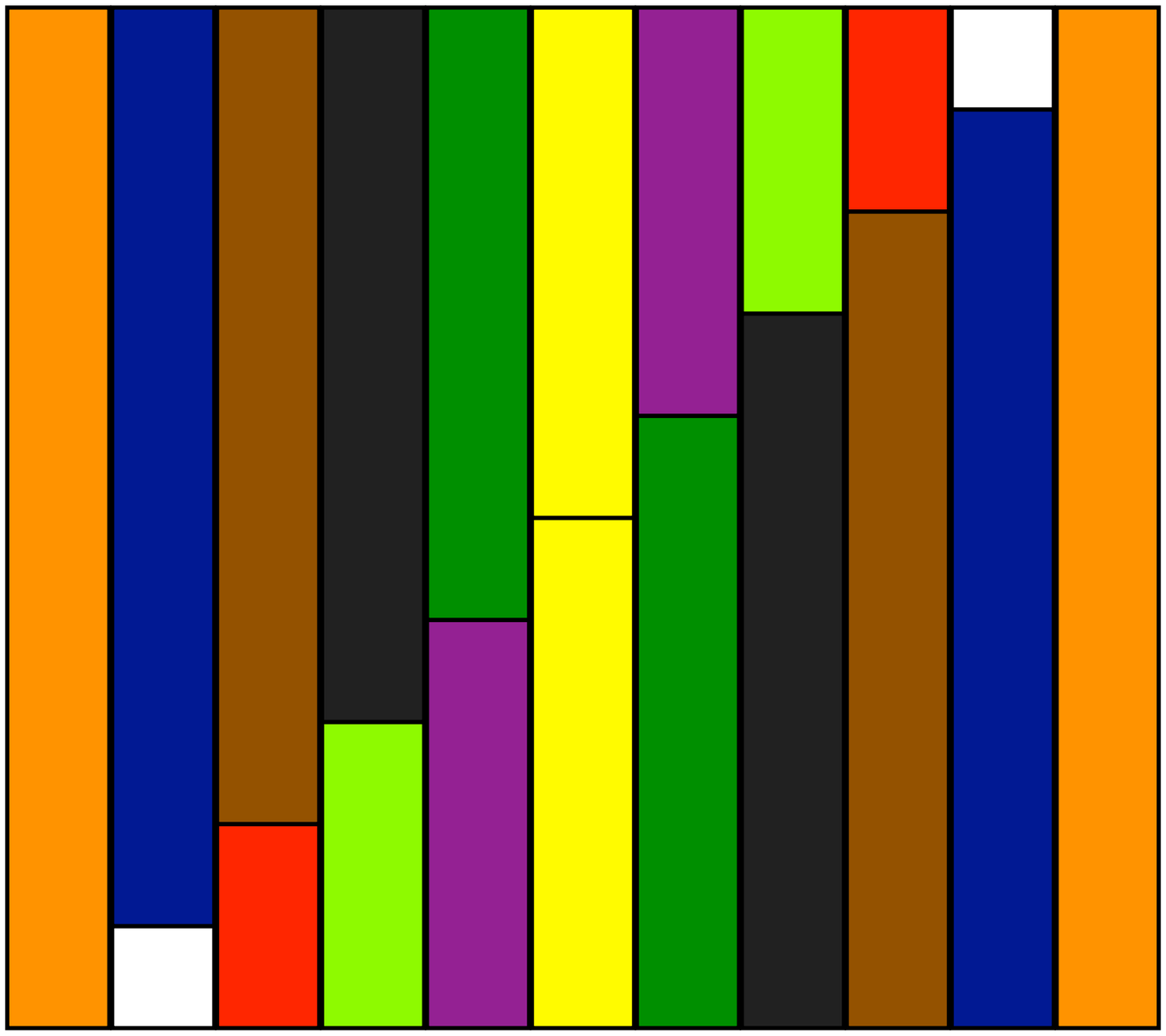
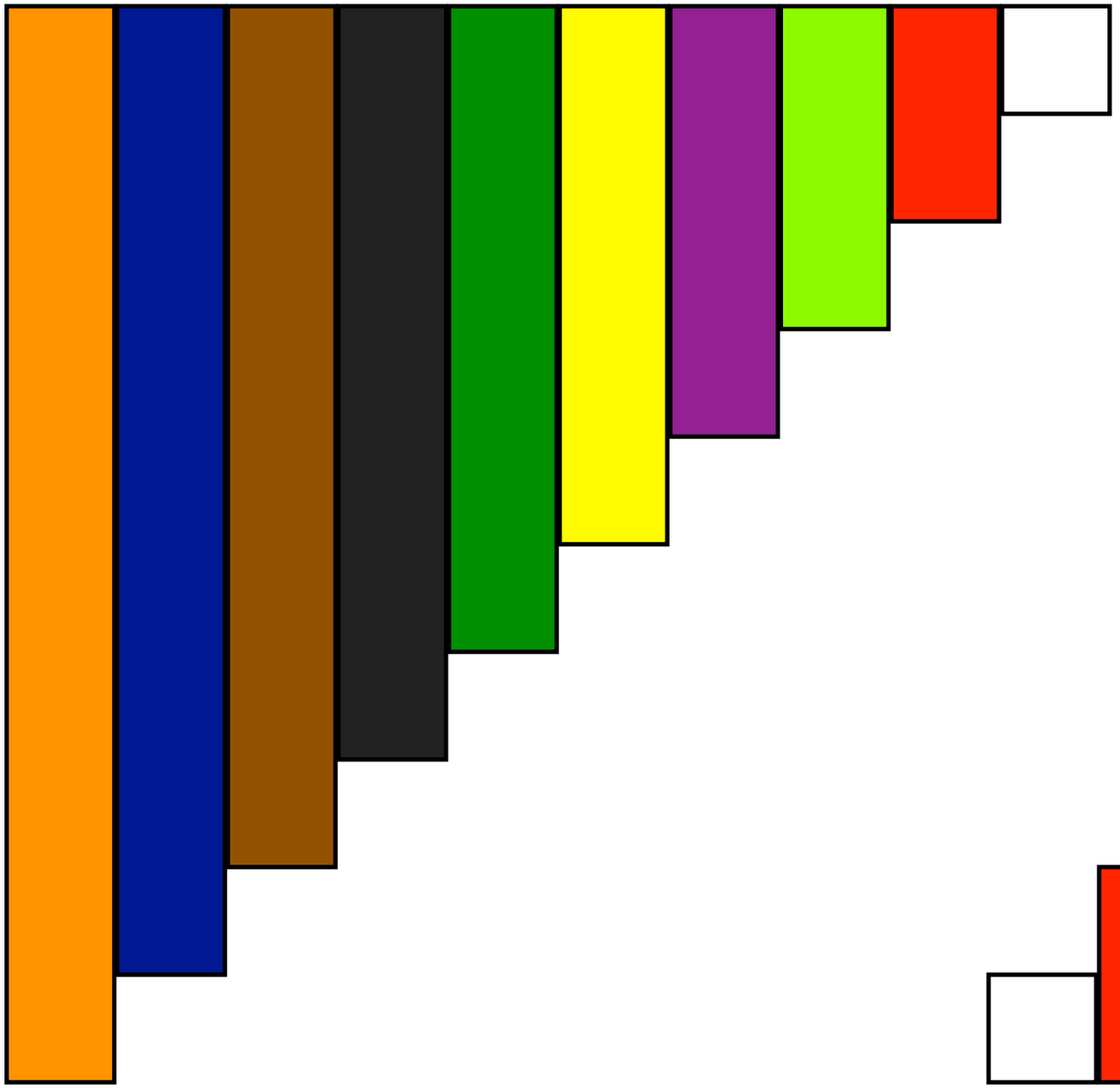
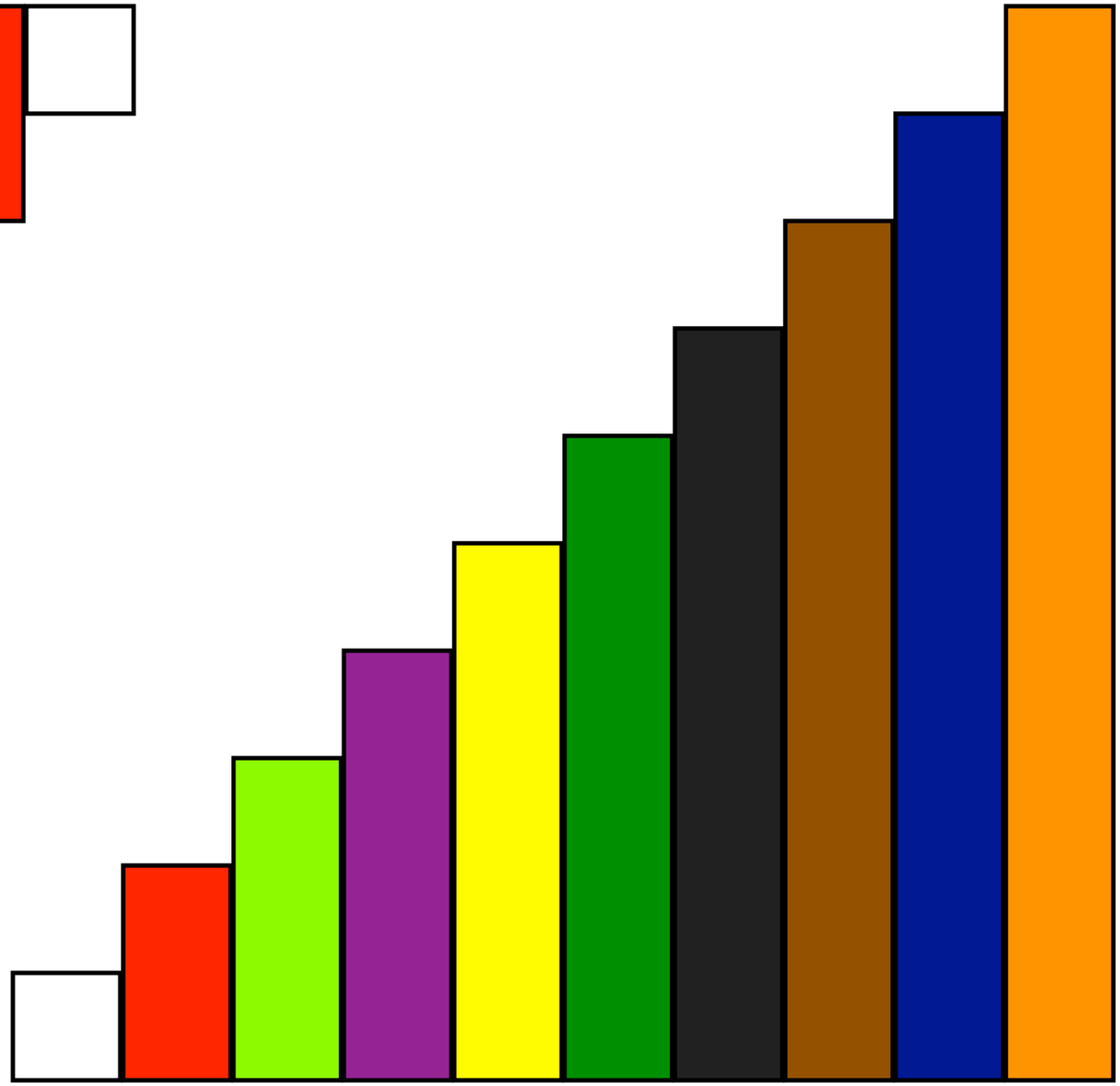
Number/Colour Match



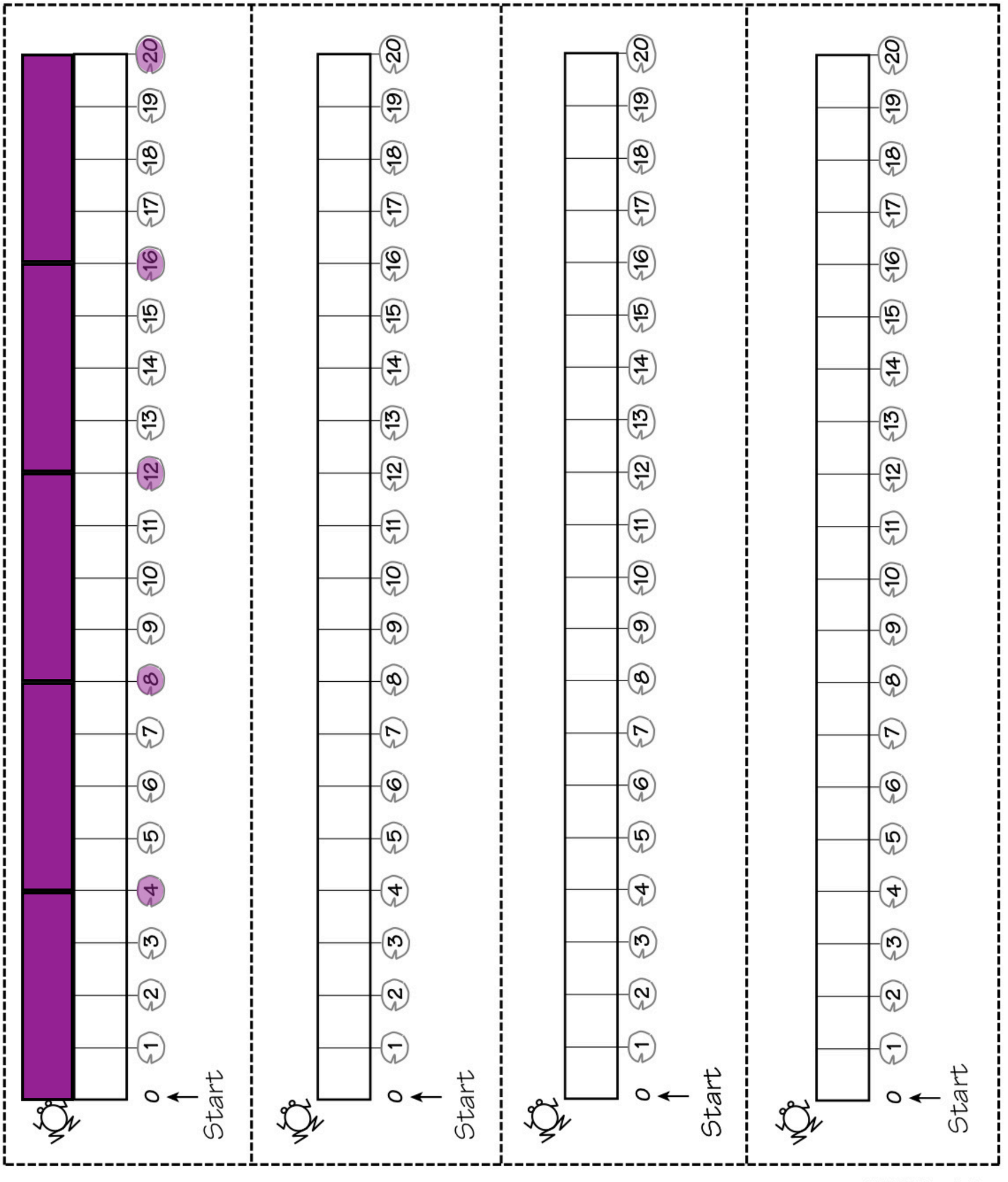
Number/Colour Match





Jumping Frogs

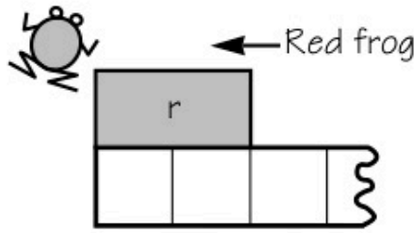
LILY PAD STRIPS



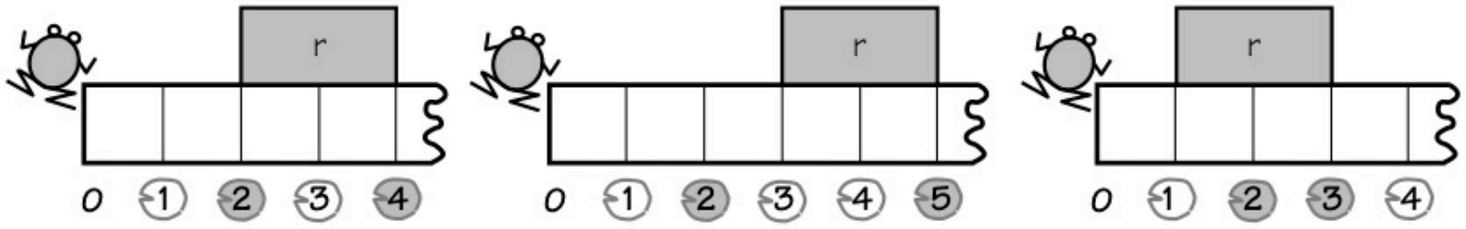
On Their Own

Make a Cuisenaire Rod "frog" jump! Which lily pads will the frog land on?

- With a partner, choose a rod of any color. Pretend that your rod is a frog that jumps its own length.
- Color the picture of the frog on a lily pad strip the same color as your rod.
- Get your frog ready to jump. Make it jump onto the lily pad strip starting at 0. Color the lily pad at the end of the jump the same color as your frog. Here's an example.



- Jump again! Start this jump where the first jump ended. Color the lily pad at the end of each jump. Here's an example:



Okay

Not Okay
(Second jump doesn't begin where first jump ended.)

- Make your frog jump all the way across the strip, coloring the lily pads at the end of each jump.
- Now choose a rod of a different color. Make this "frog" jump its own length along a new lily pad strip. Color to show the jumps. Do the same for different colored rods.
- Cut your lily pad strips apart. Compare them. Look for patterns.
- Be ready to talk about what you find out.

- Make your frog jump all the way across the strip, coloring the lily pads at the end of each jump.
- Now choose a rod of a different color. Make this "frog" jump its own length along a new lily pad strip. Color to show the jumps. Do the same for different colored rods.
- Cut your lily pad strips apart. Compare them. Look for patterns.
- Be ready to talk about what you find out.

The Bigger Picture

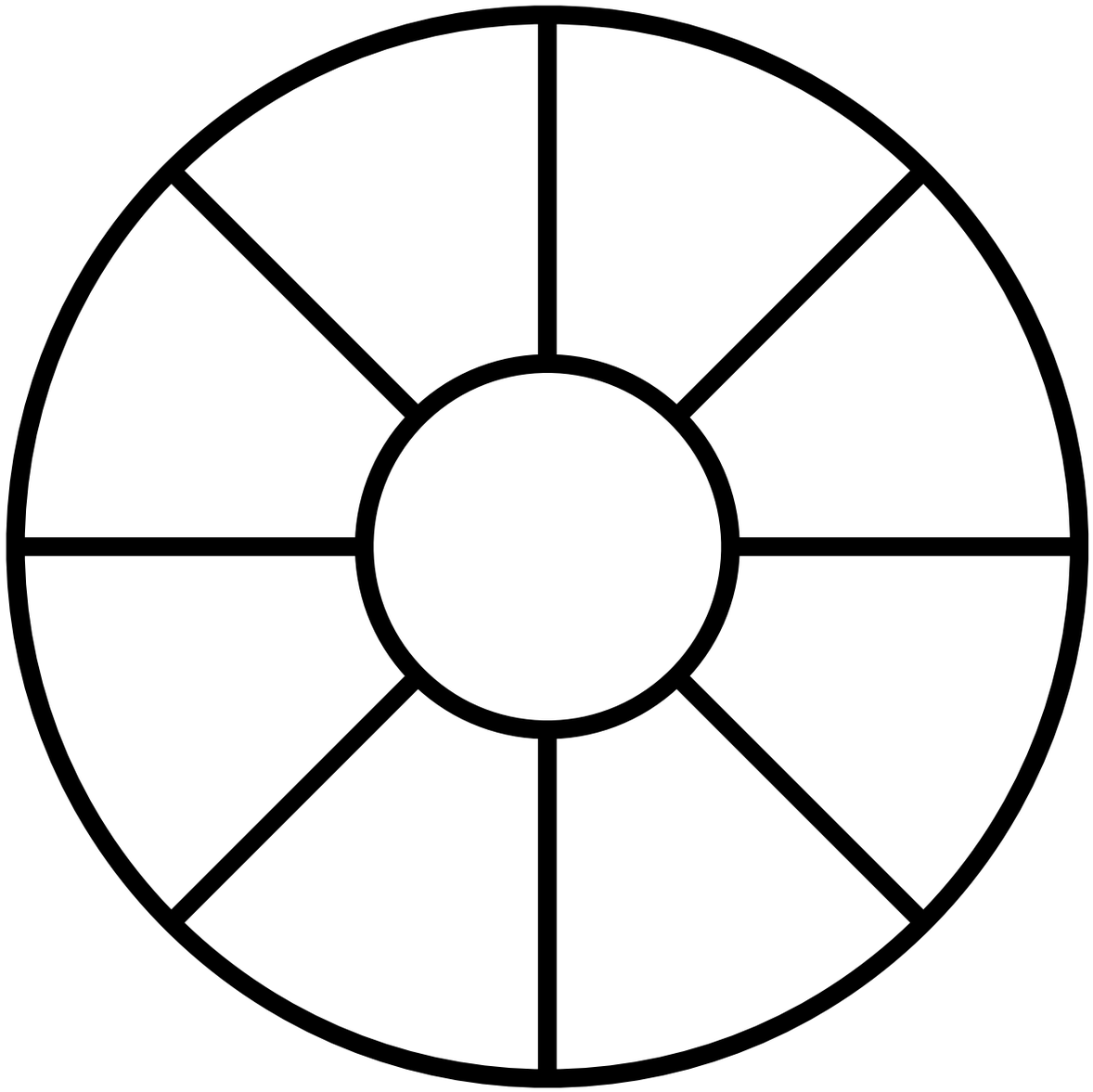
Thinking and Sharing

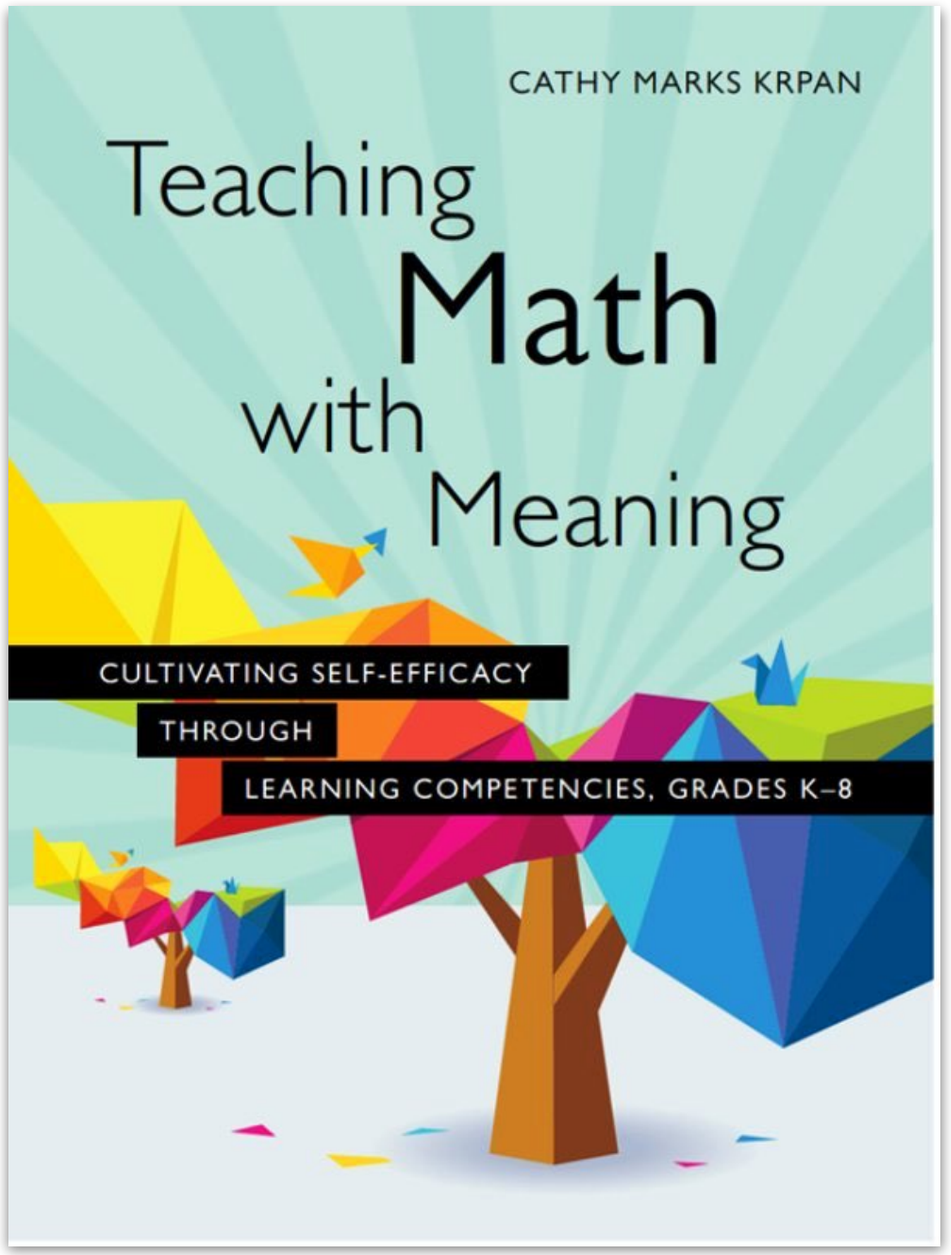
Write the colors, from *white* to *orange*, as column headings across the chalkboard. Call on pairs to post their lily pad strips in the appropriate columns.

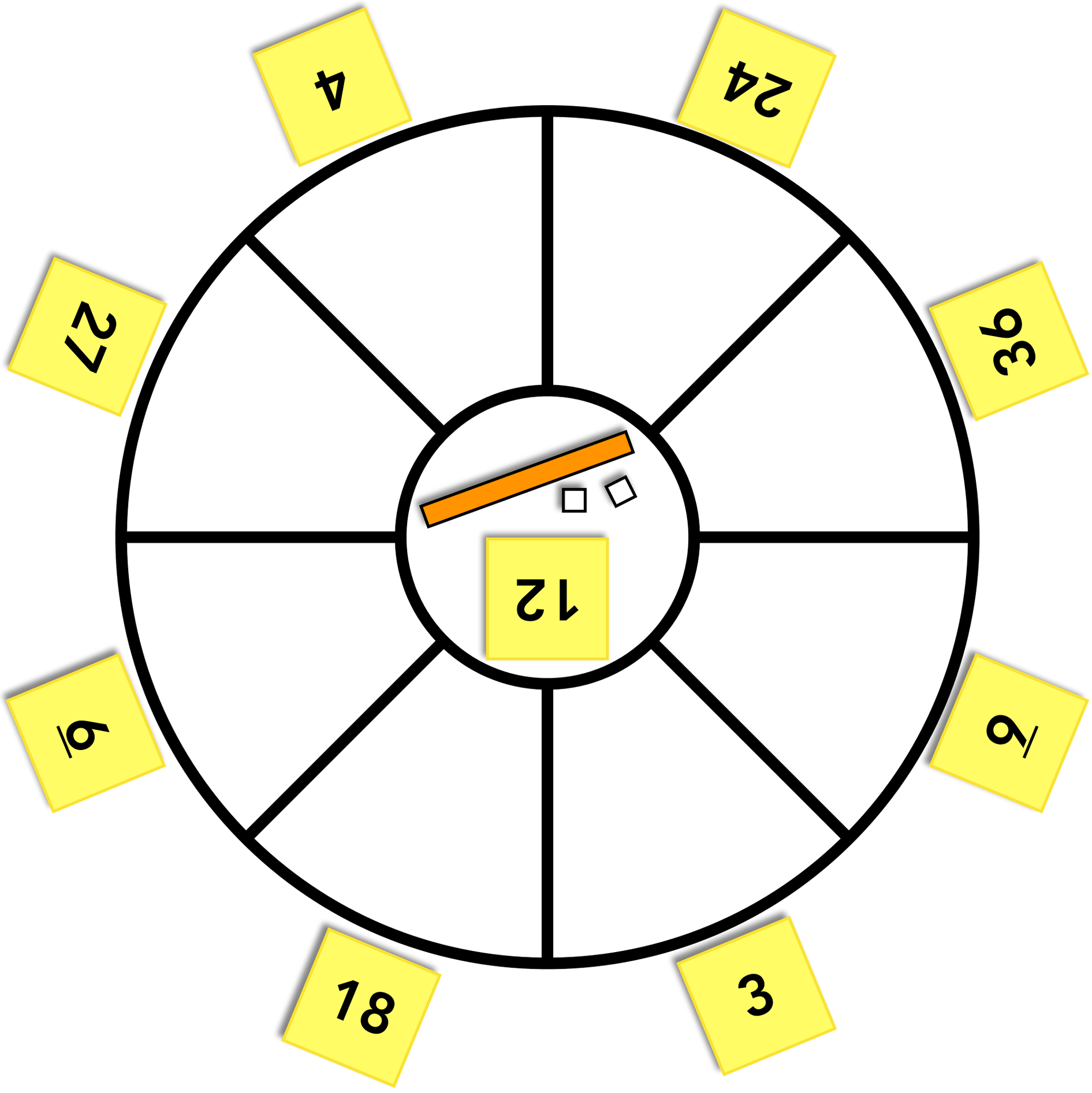
Use prompts such as these to promote class discussion:

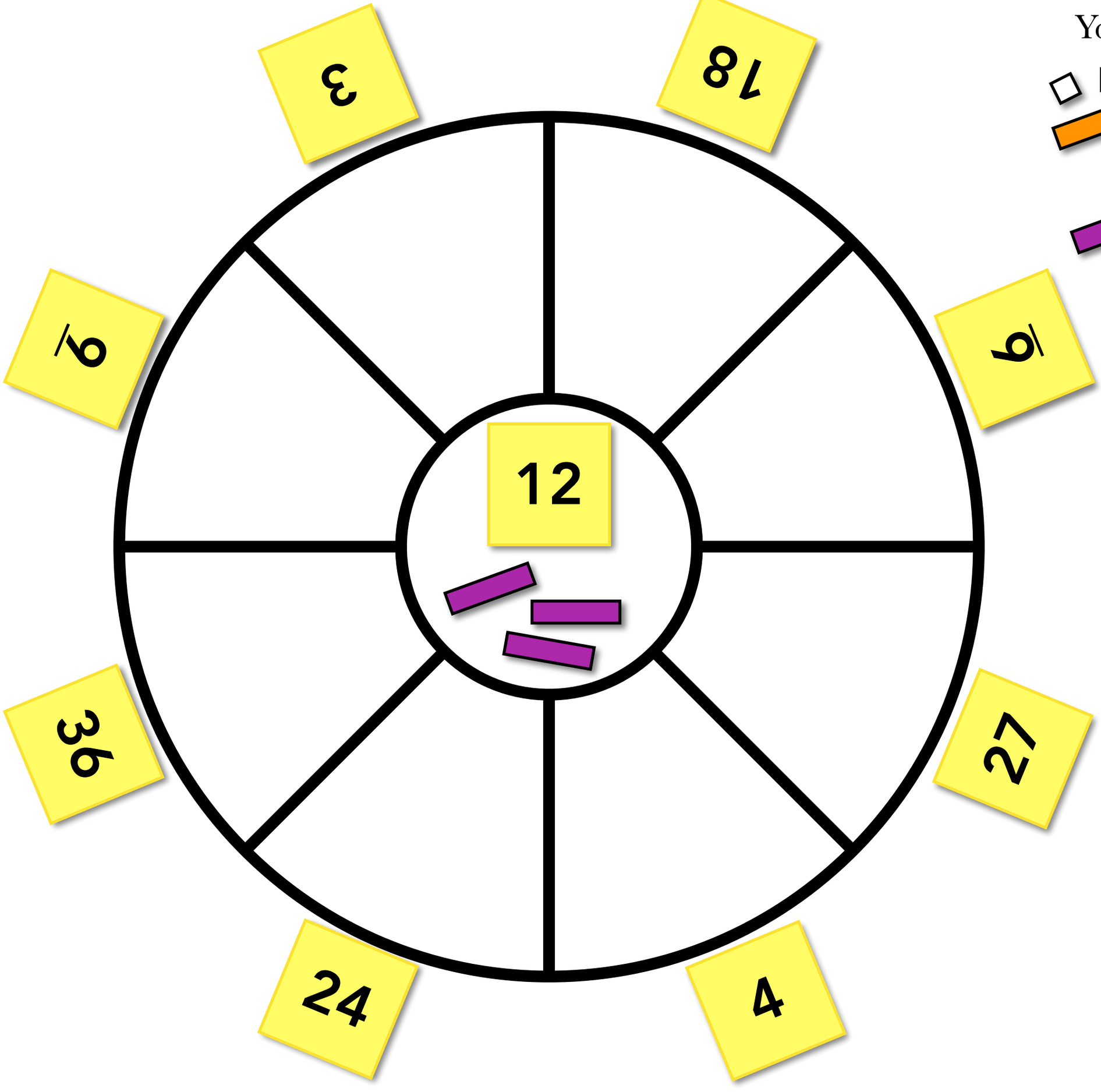
- What do you notice about the posted lily pad strips?
- How are the strips the same? How are they different?
- Which frogs' jumps could you predict? Why?
- At which lily pads did the _____(name a color) frog land?

Concept Circle

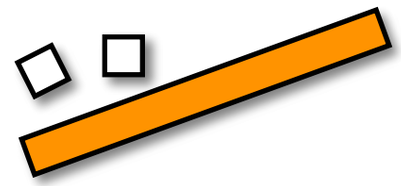




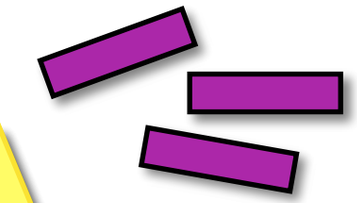

4
24
27
36
12
9
9
18
3

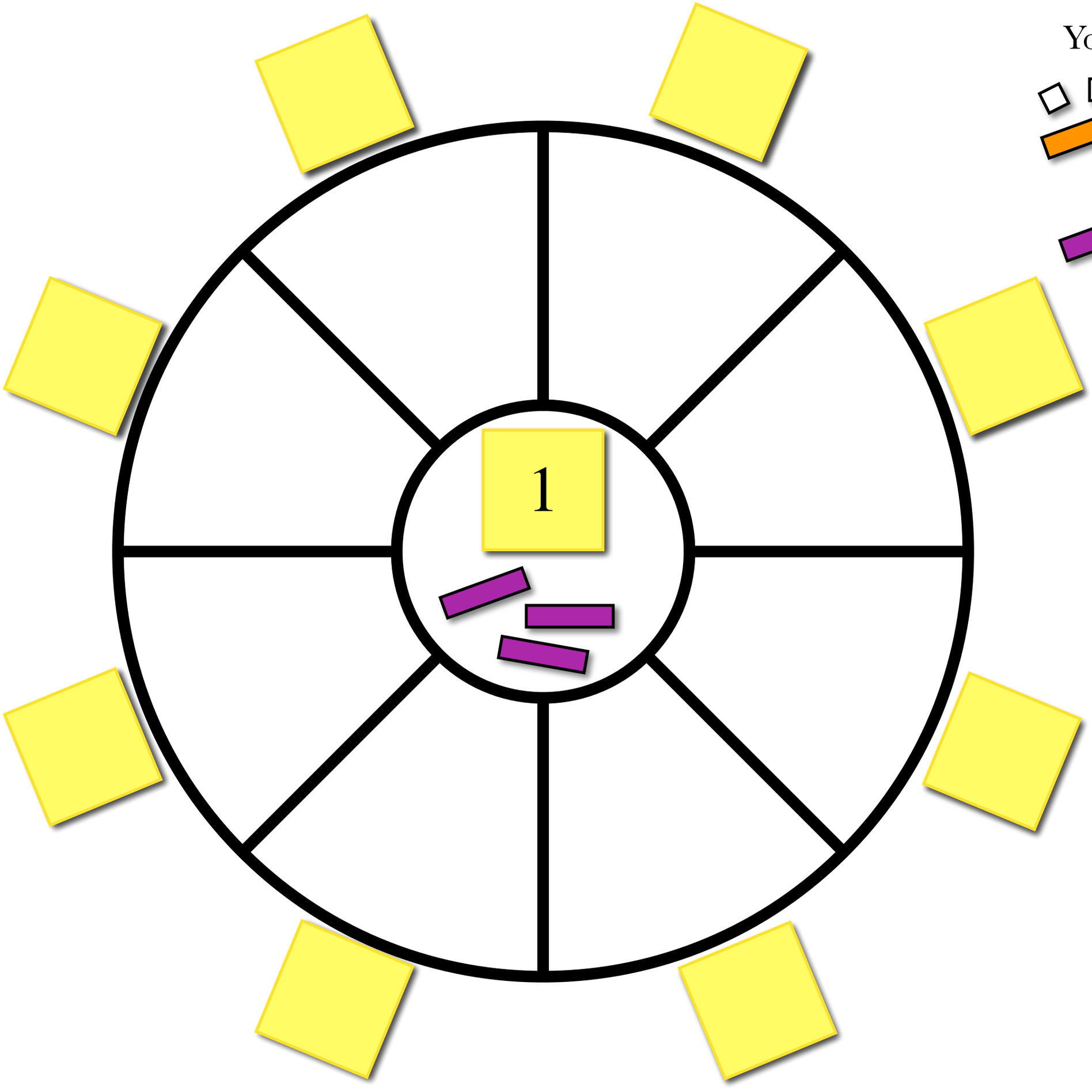

You choose:
or
3
18
9
6
12
36
24
4
27

You choose:



or





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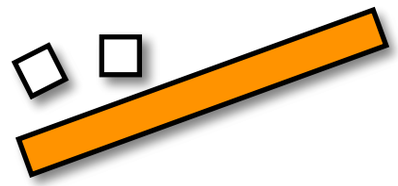

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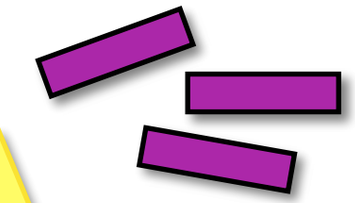
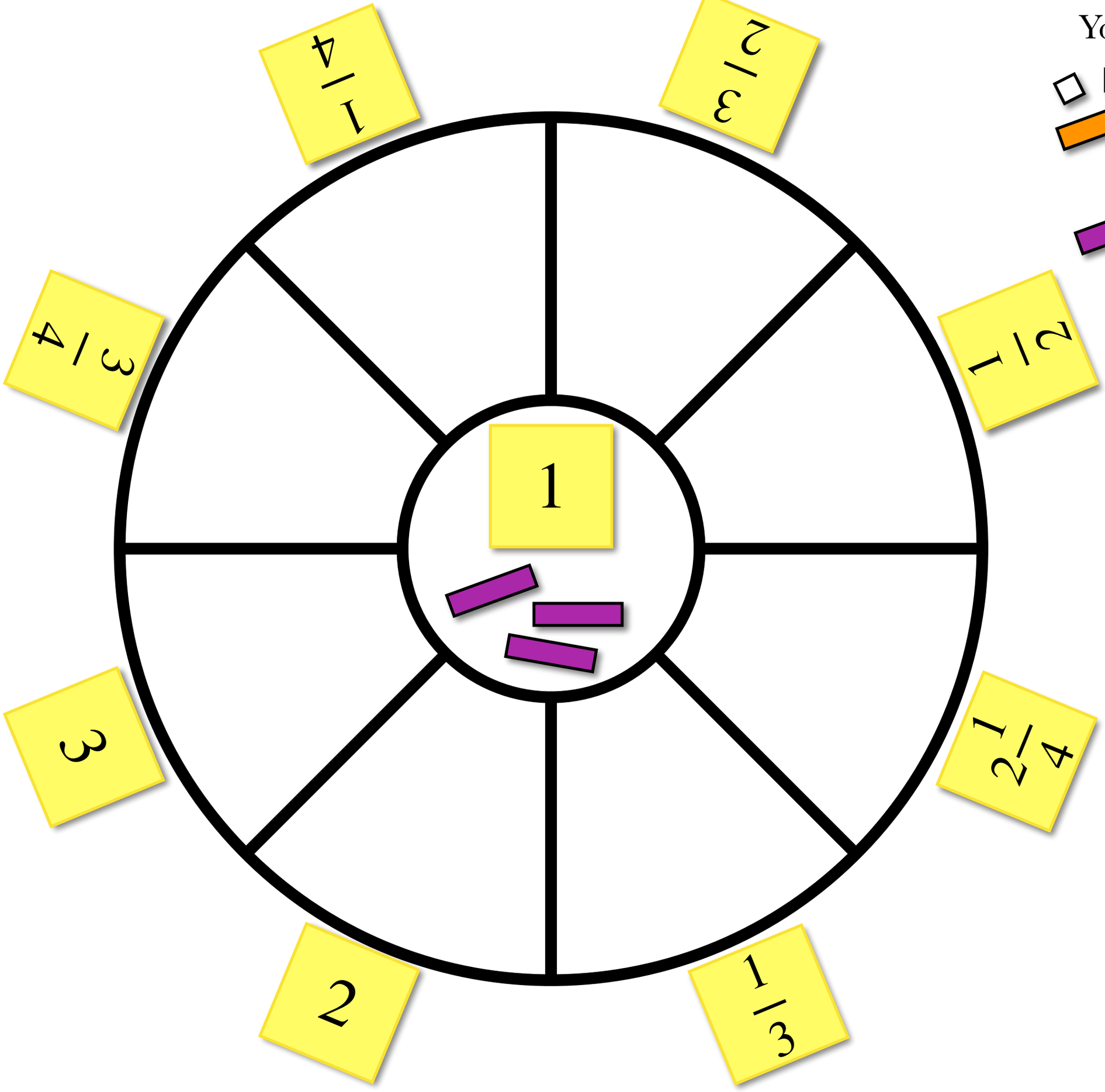
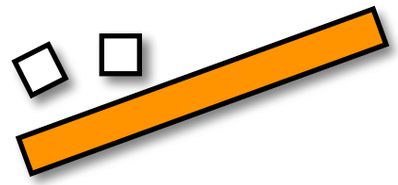




You choose:



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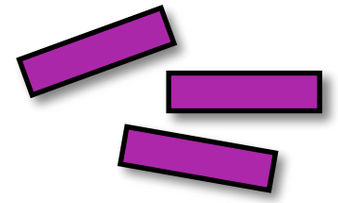
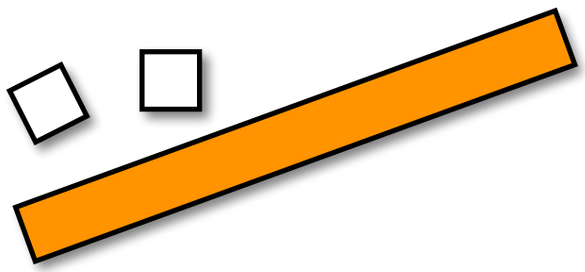
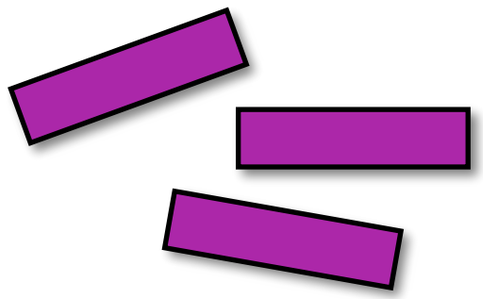
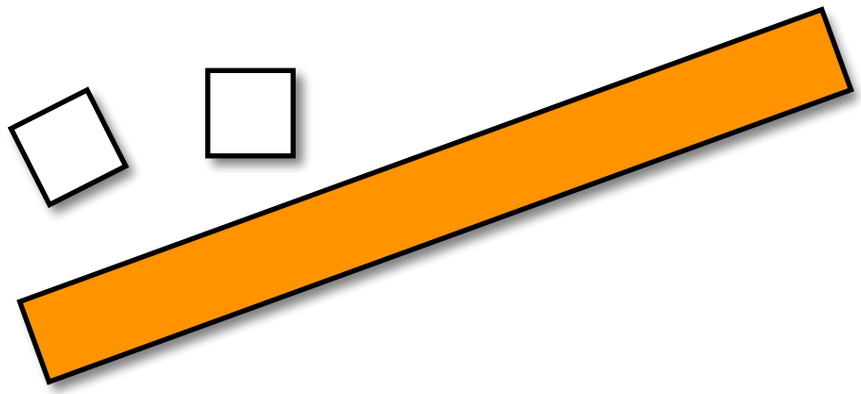
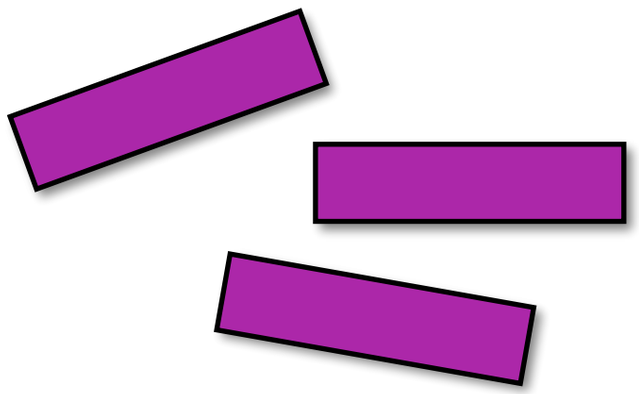


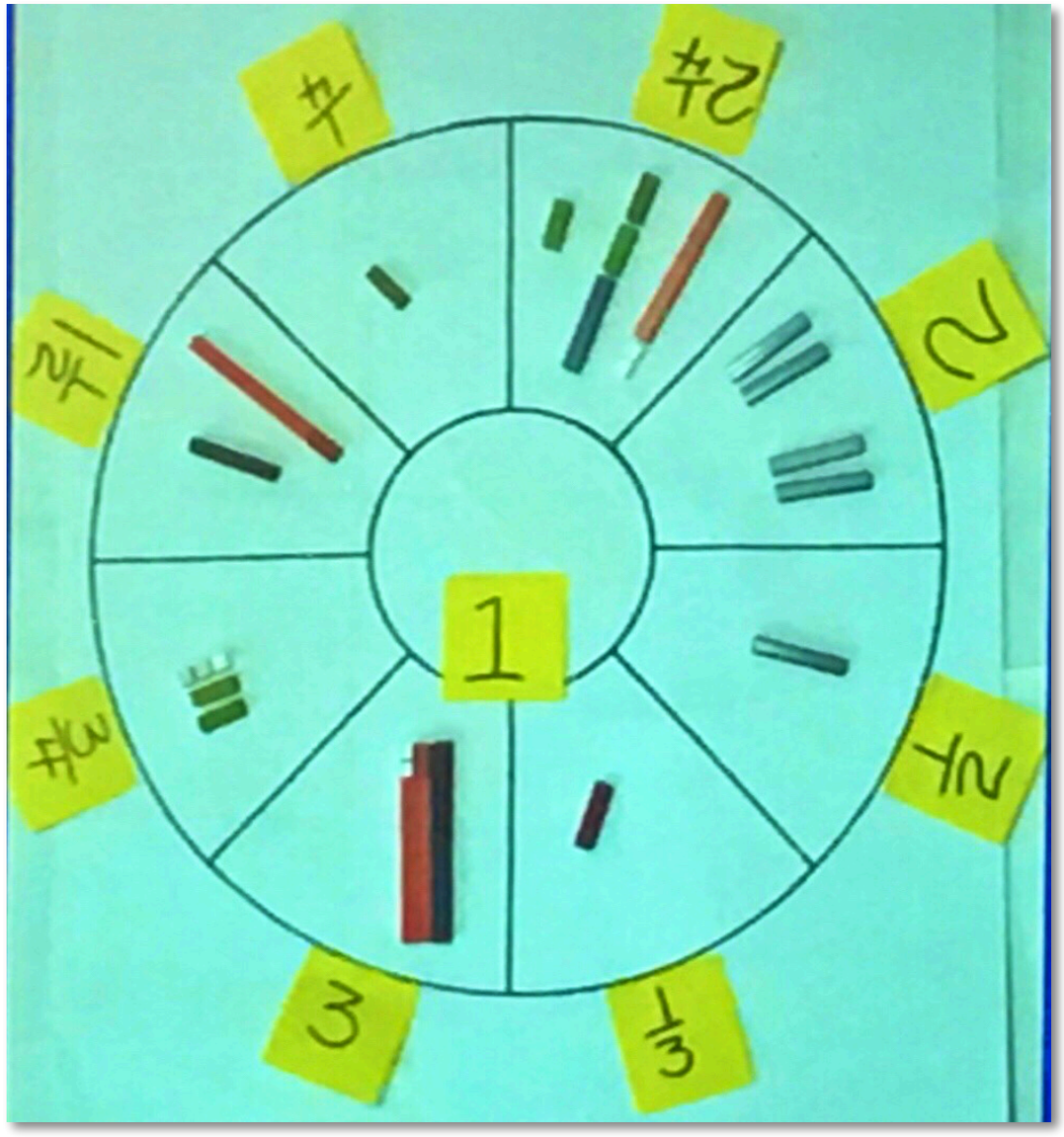
Why  or  ?



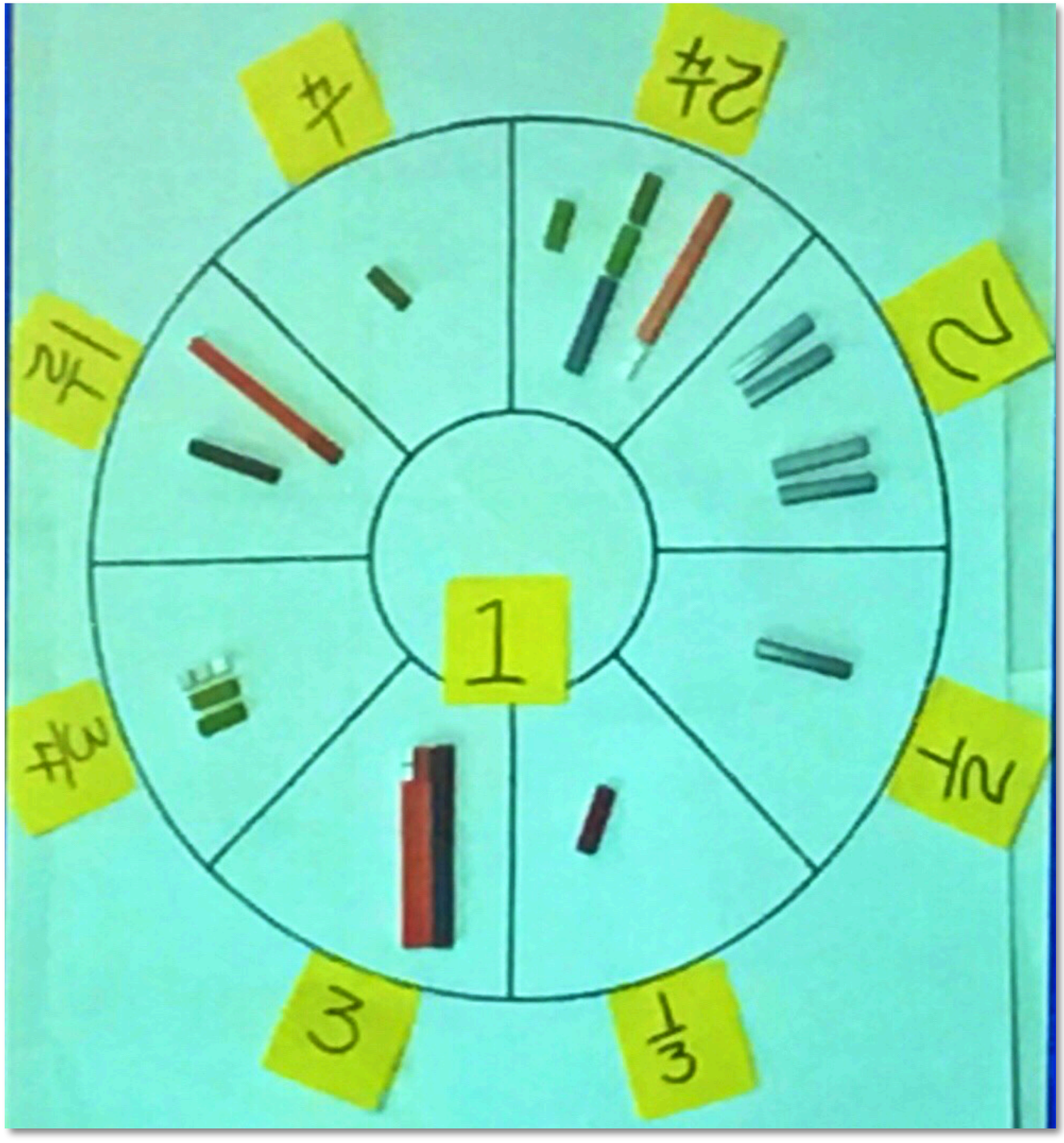
"You can represent a number in a variety of ways. Each representation of a number can **focus** on a **different aspect** of a number."

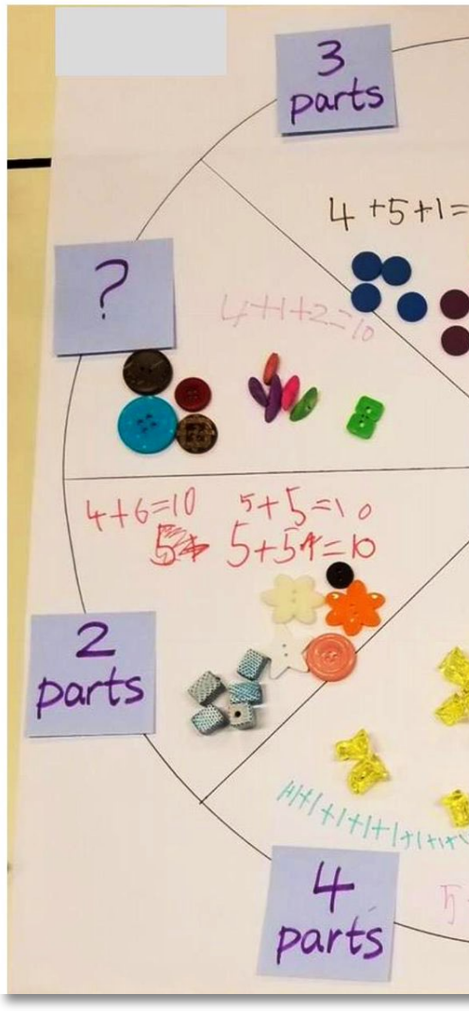
–Marian Small



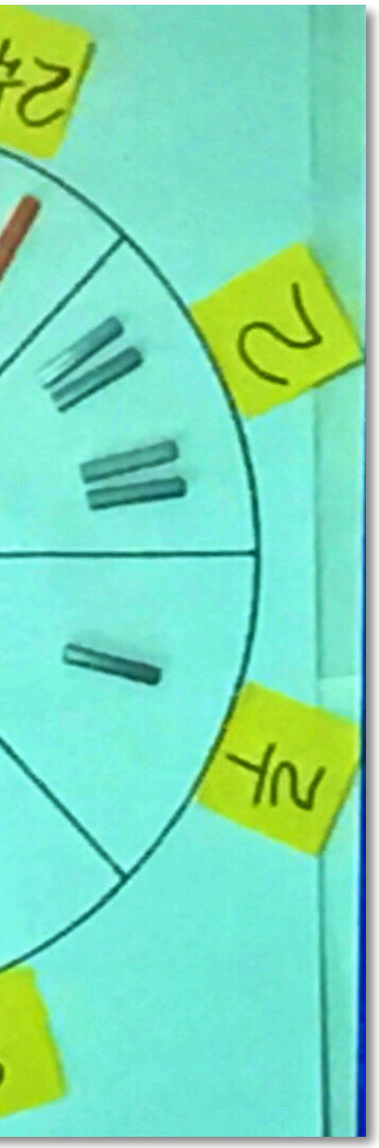

1
2
3
4
1/2
1/3
1/4
2/4
3/4


3 parts
2 parts
4 parts
2 parts
4 parts
3 parts
?
?
10
4+5+1=10
4+6=10
5+5=10
5+5=10





"How many ways can you make 1?"



constraints

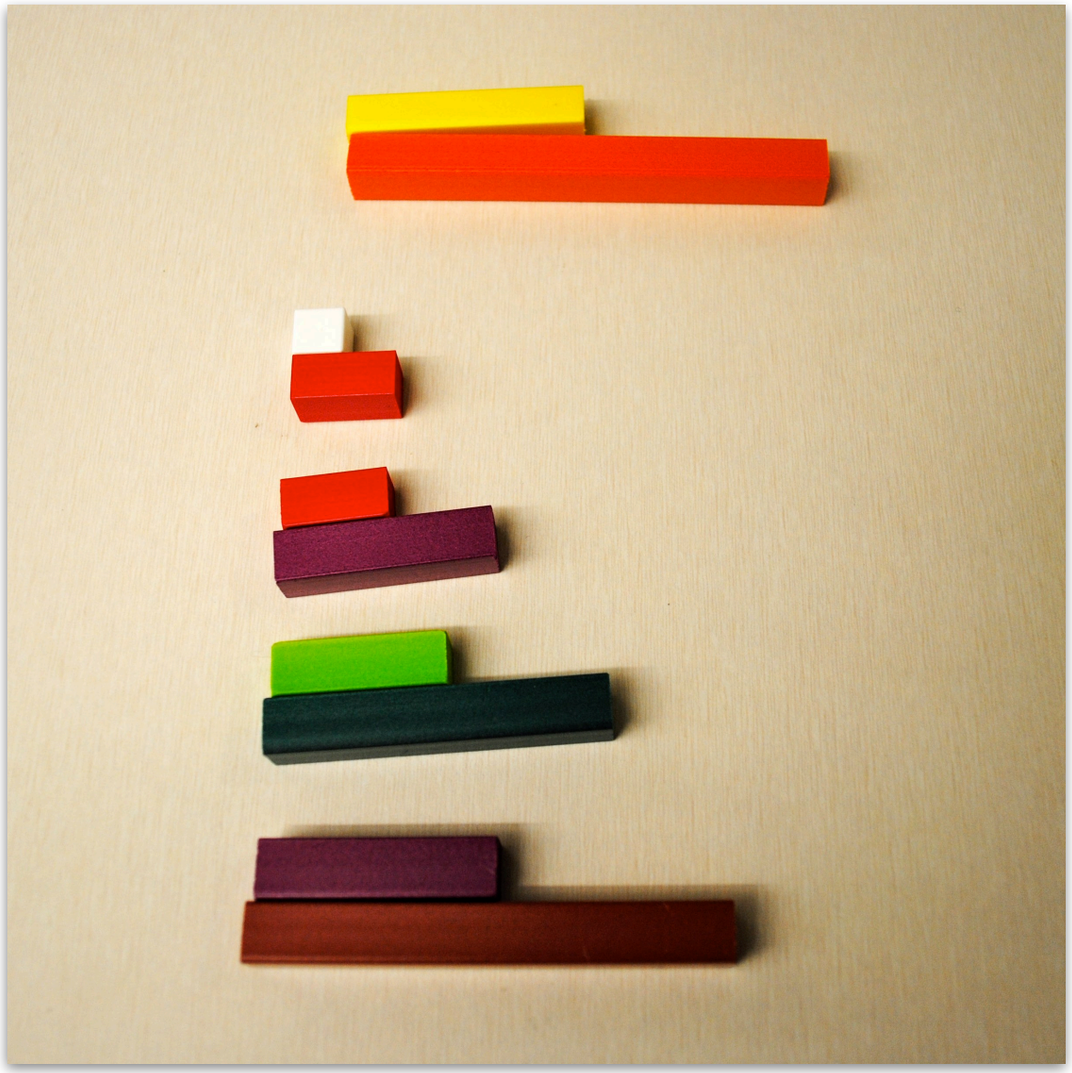
Fraction Pairs

Find a rod that is ***half*** the length of the **orange** rod.

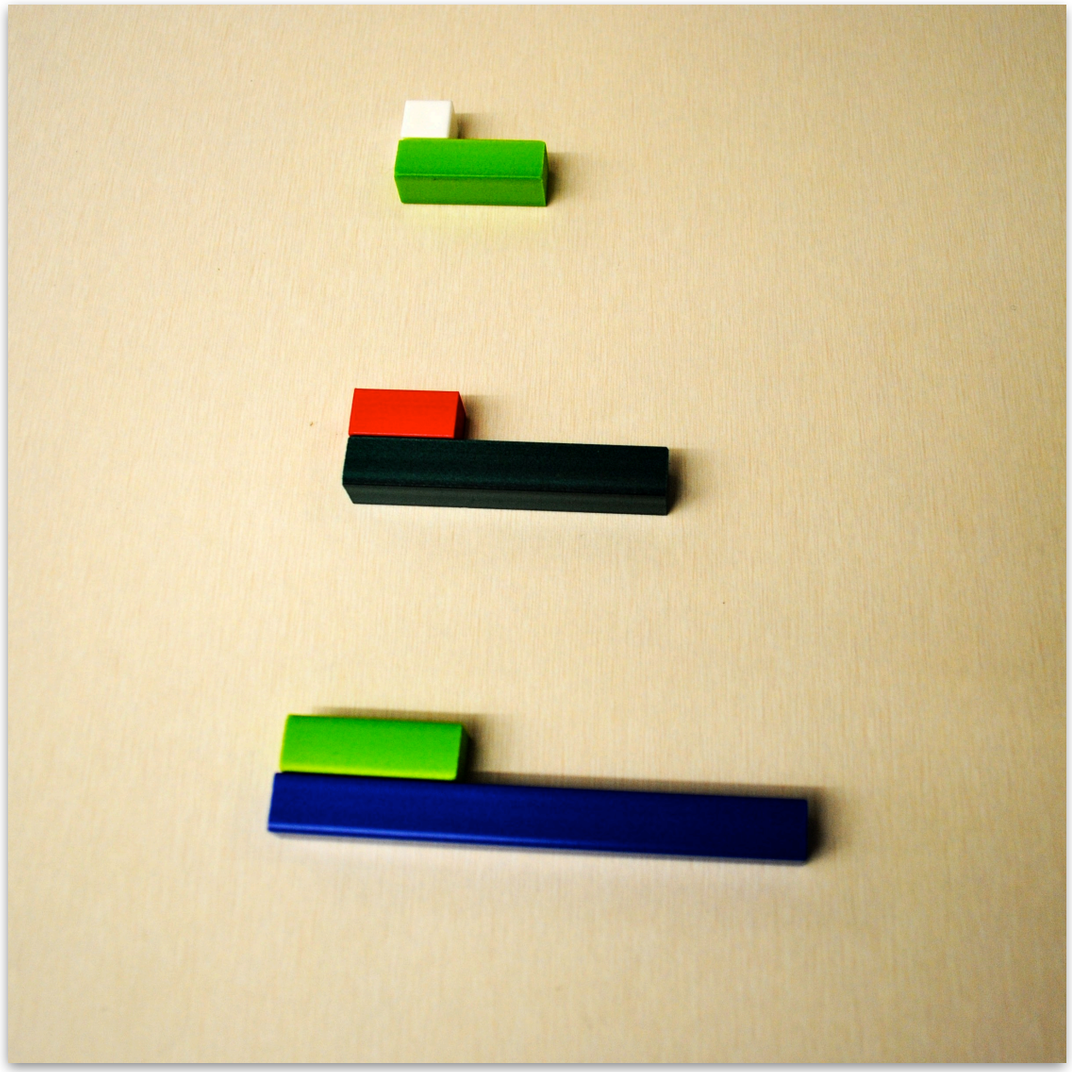
Find as many rod pairs as you can that show $\frac{1}{2}$.

Find as many rod pairs as you can that show $\frac{1}{3}$.

Fraction Pairs

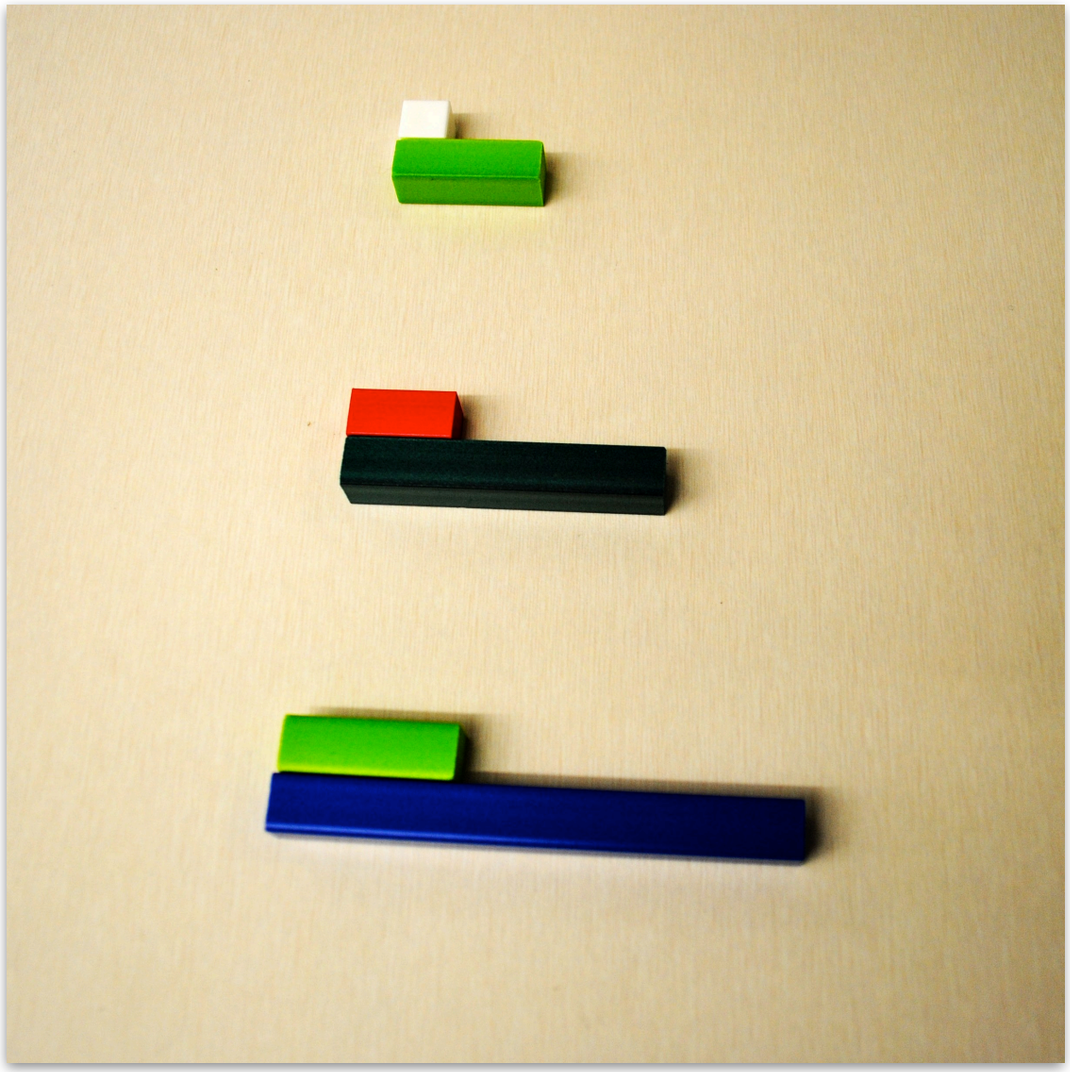


$\frac{1}{2}$

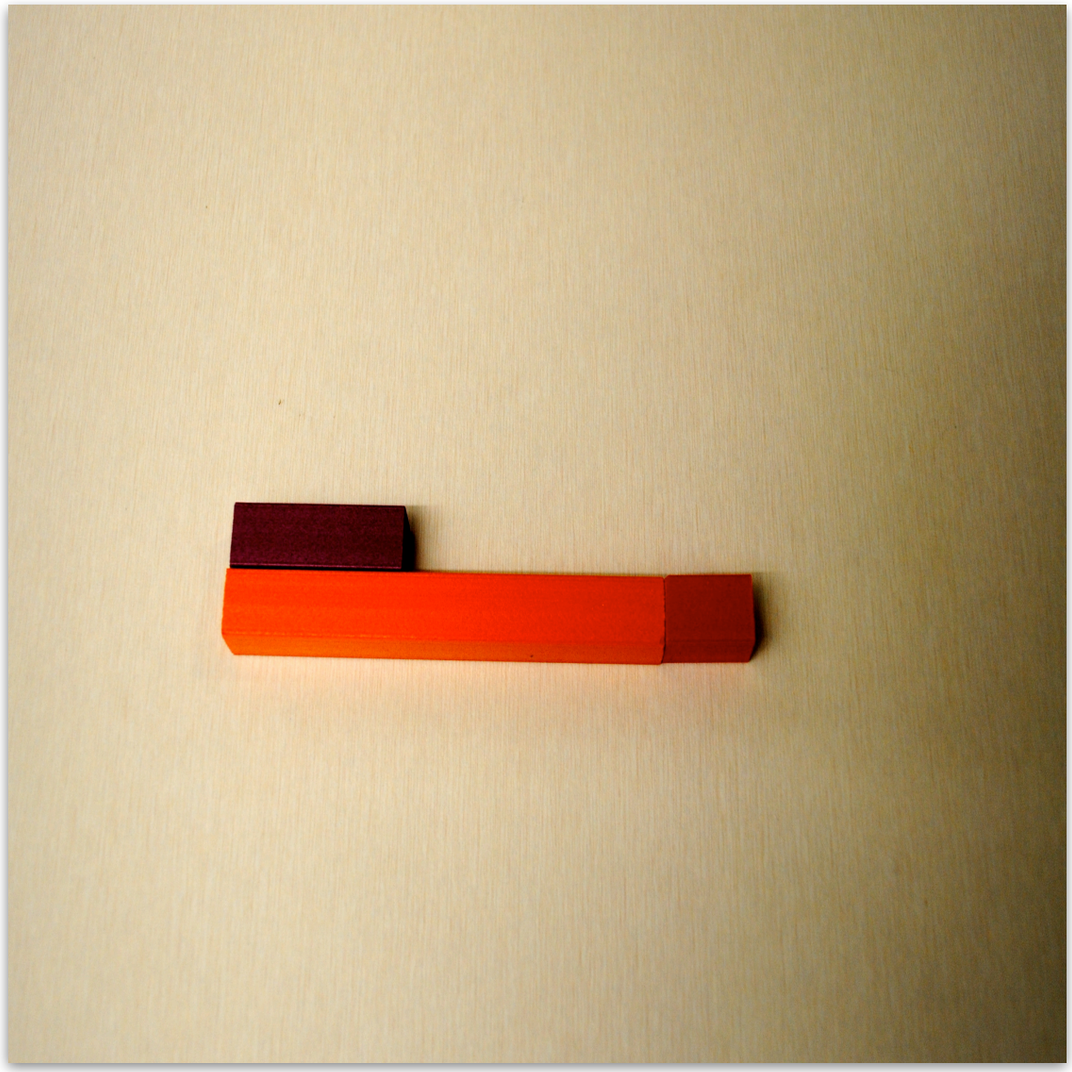


$\frac{1}{3}$

Fraction Pairs



$\frac{1}{3}$



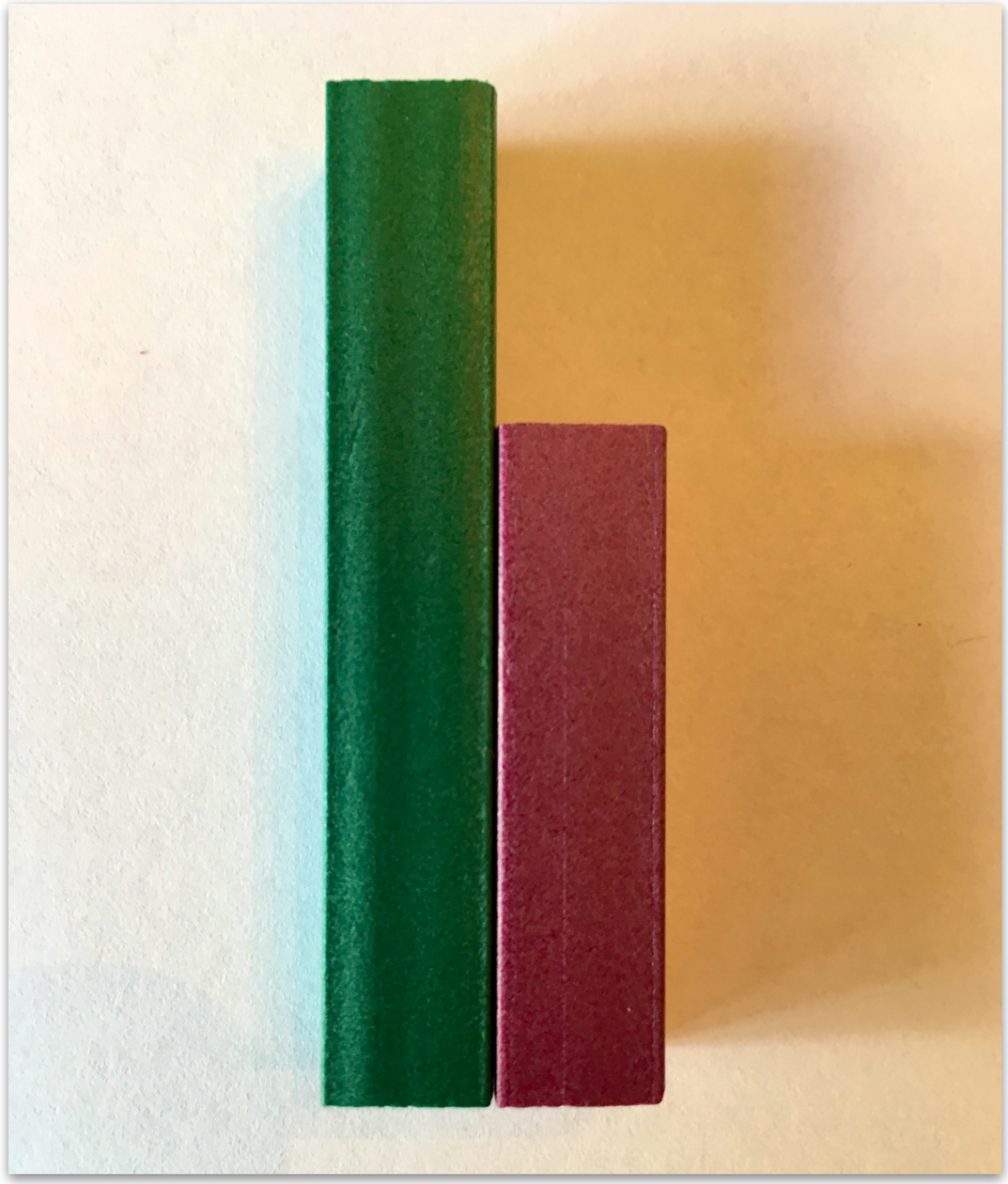
$\frac{1}{3}$

Rod Ratios

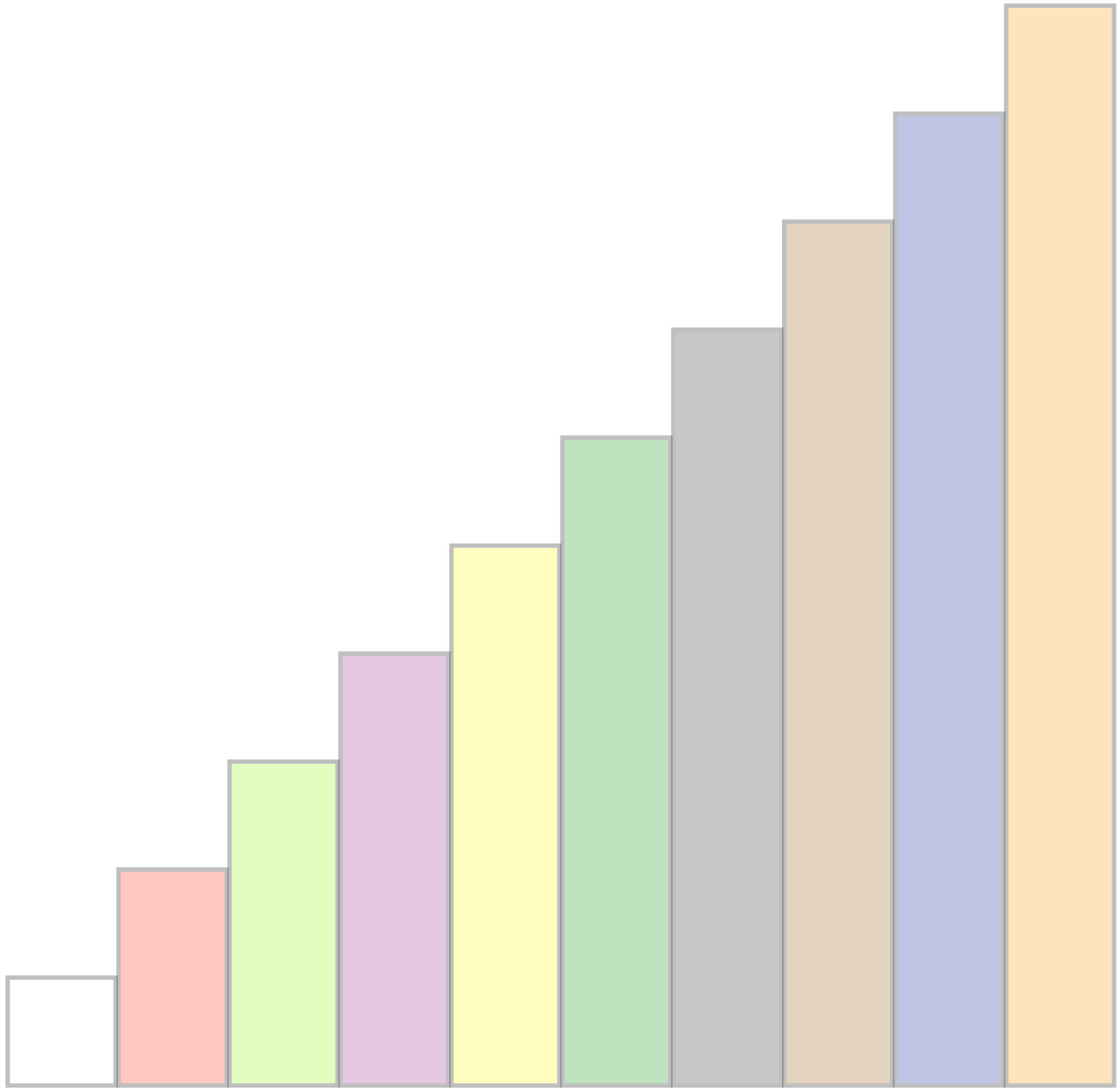
What is the ratio of this pair of Cuisenaire rods?

How do you know?

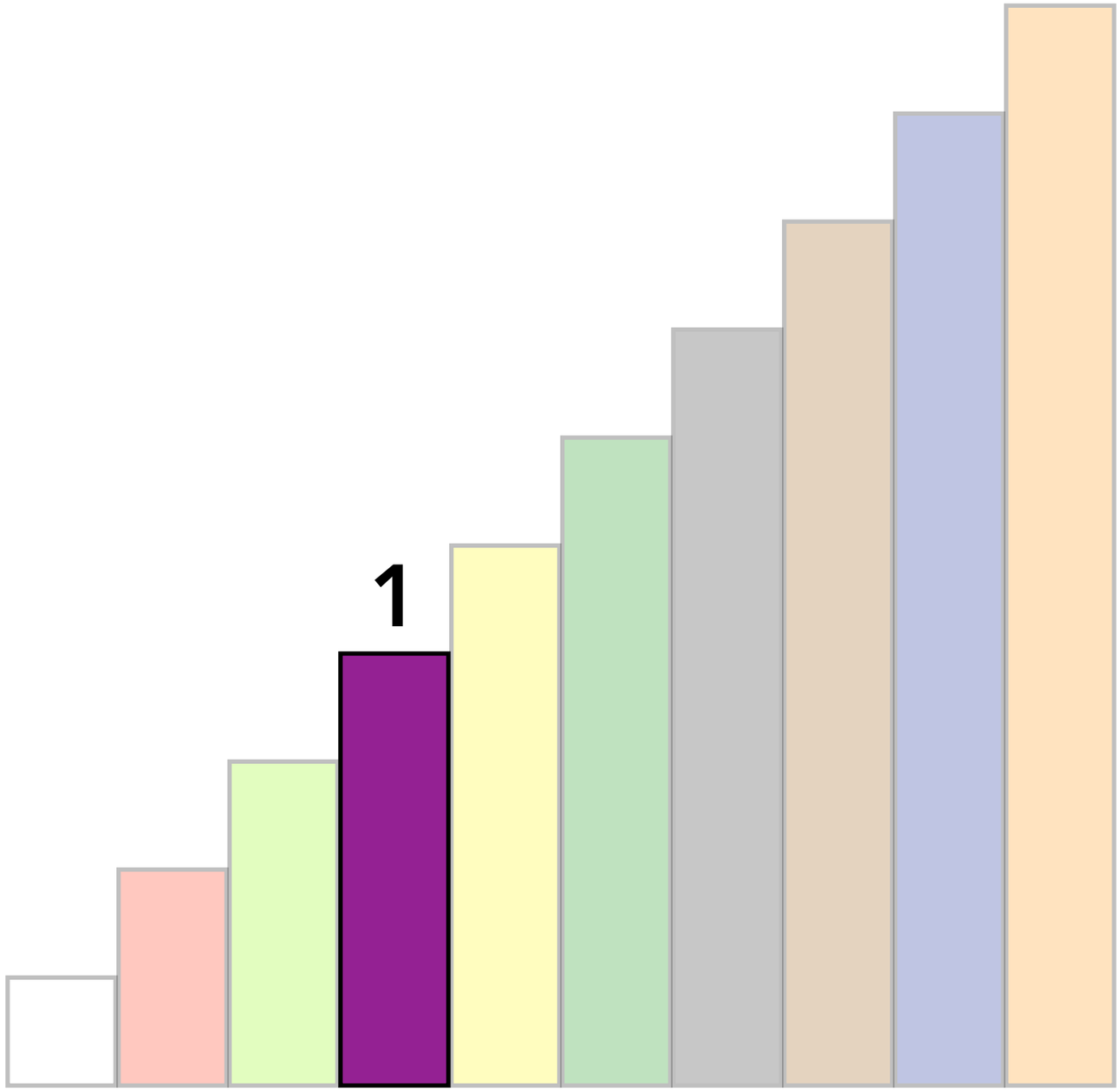
How many pairs can you find with the same ratio?



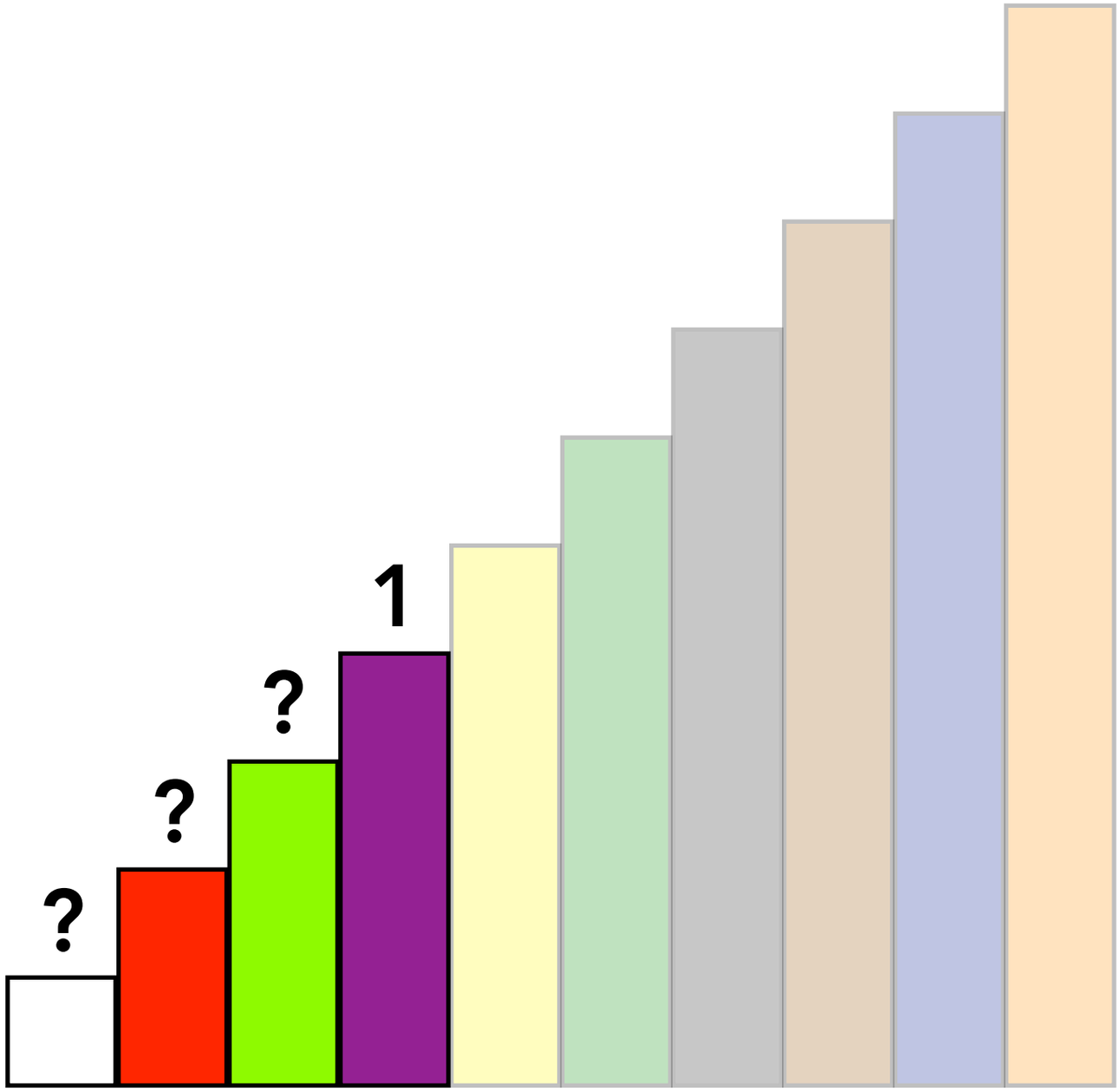
Naming Rods



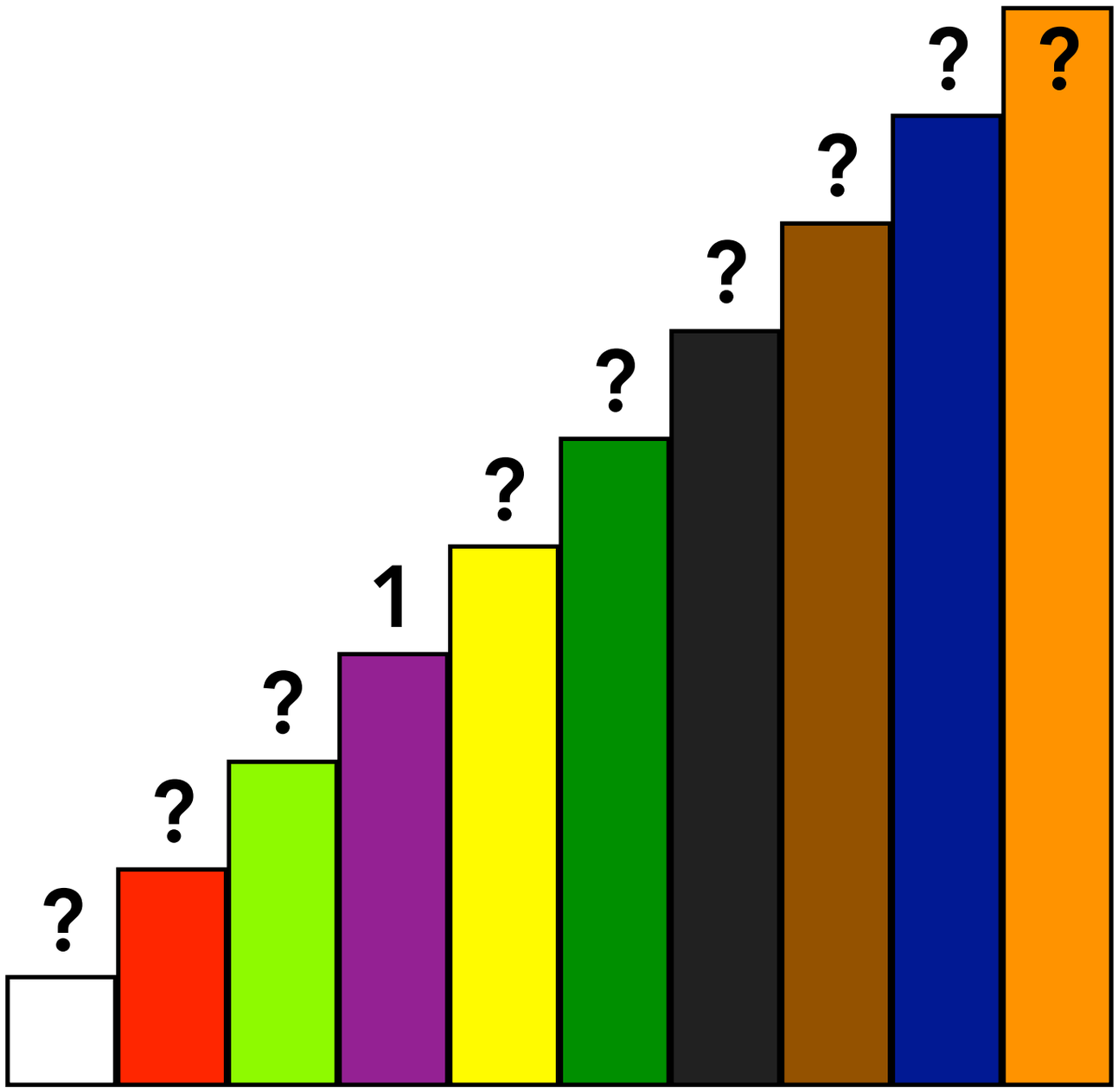
Naming Rods



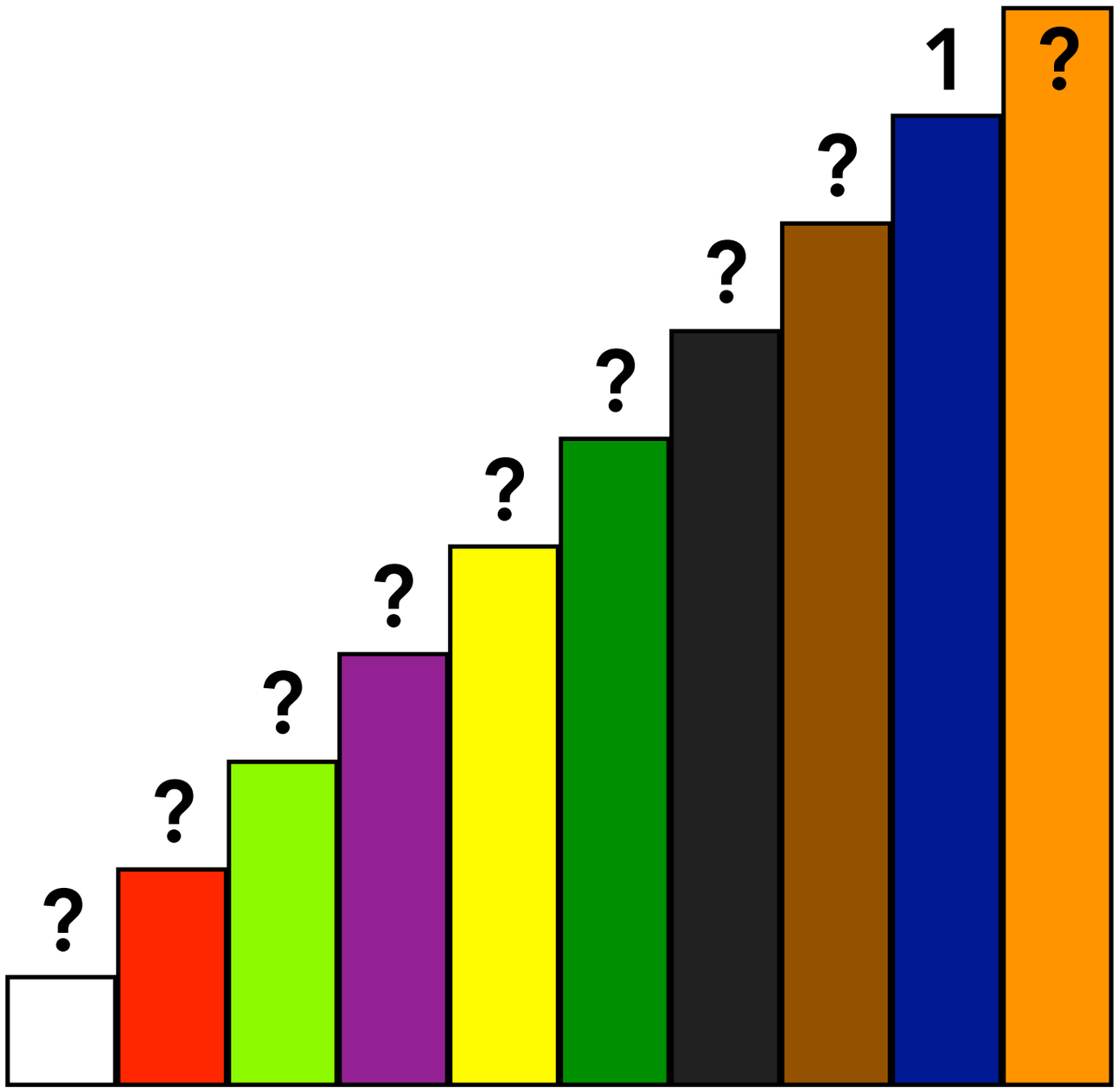
Naming Rods



Naming Rods

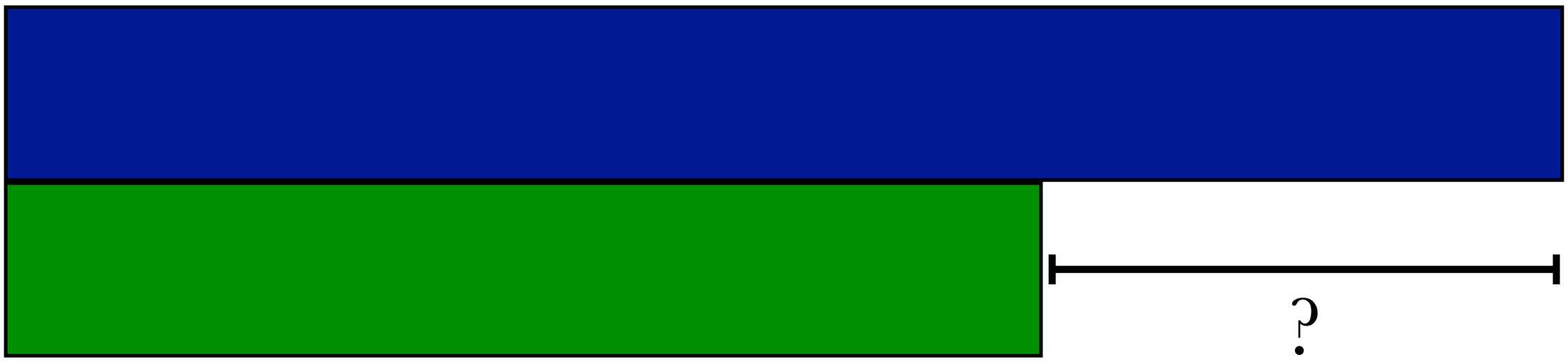


Naming Rods



Subtraction

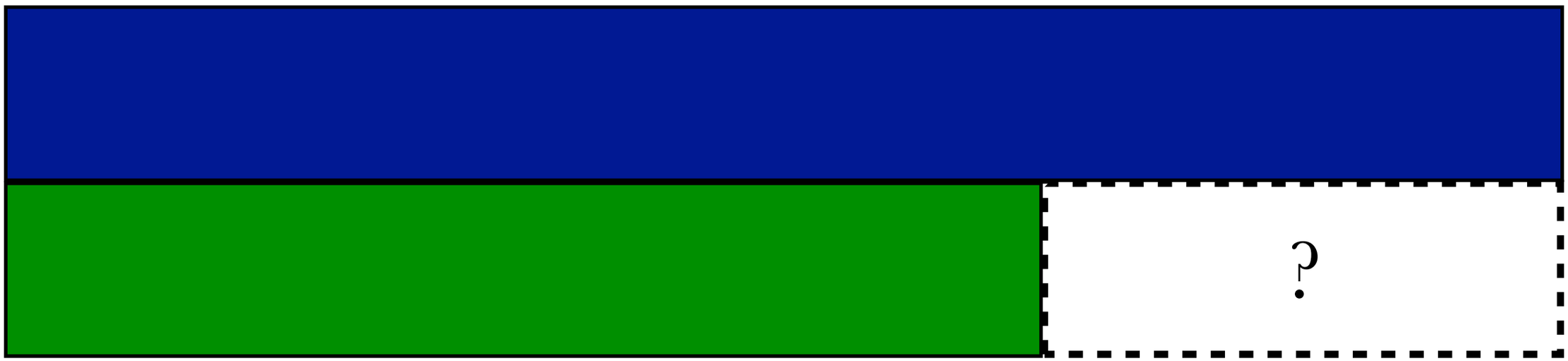
comparison



"What's the difference?"

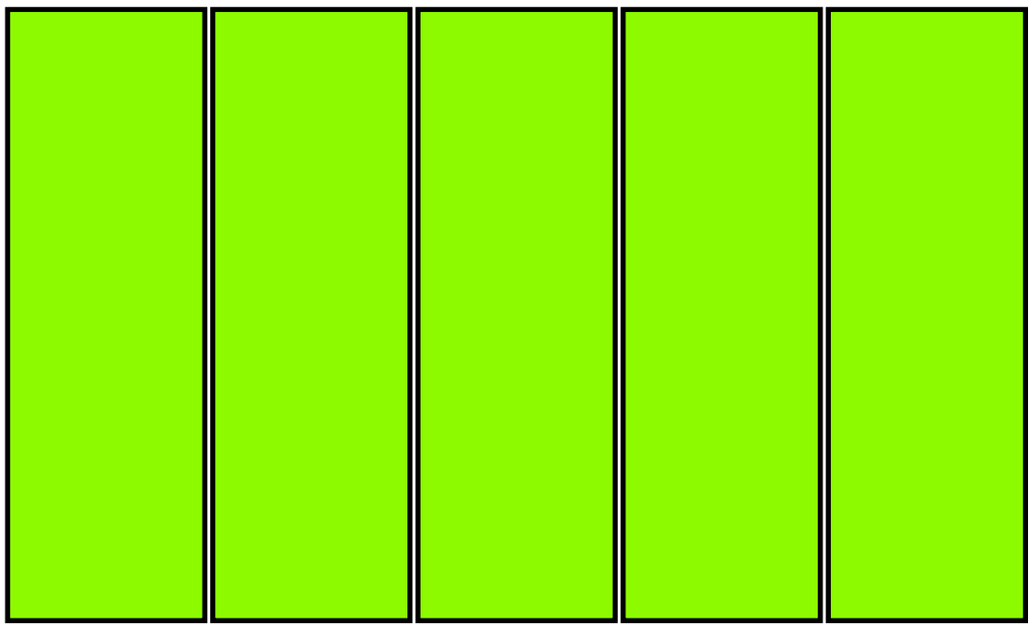
Subtraction

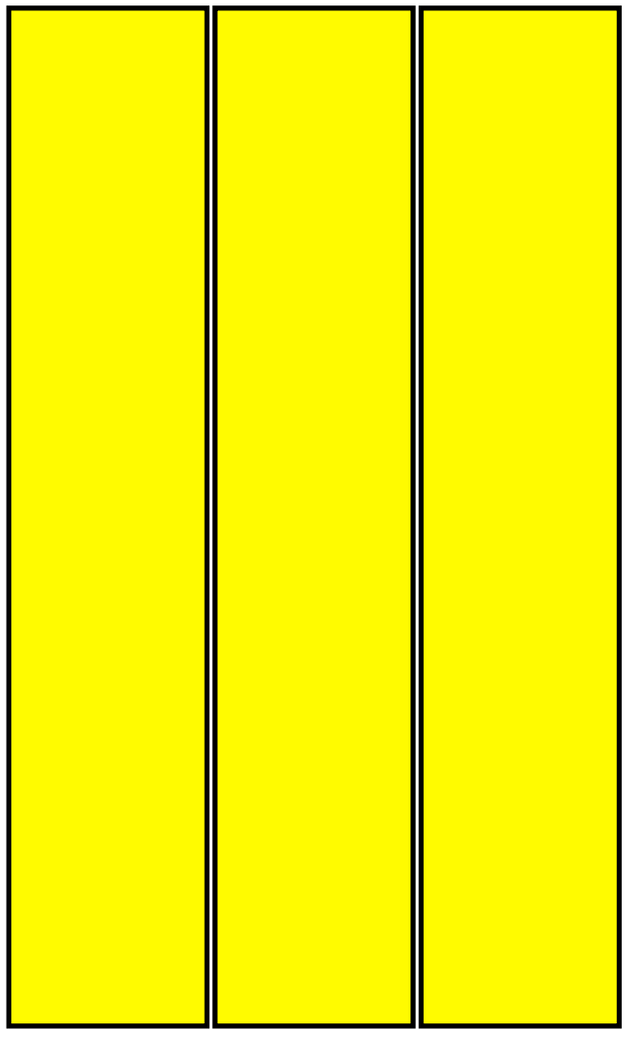
part-part-whole



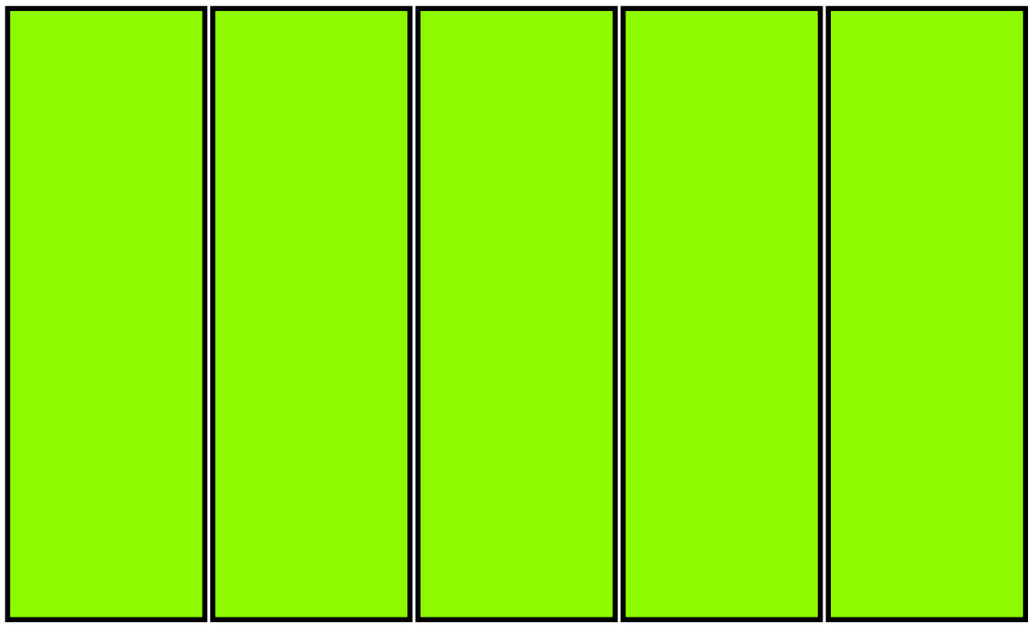
“What’s missing?”

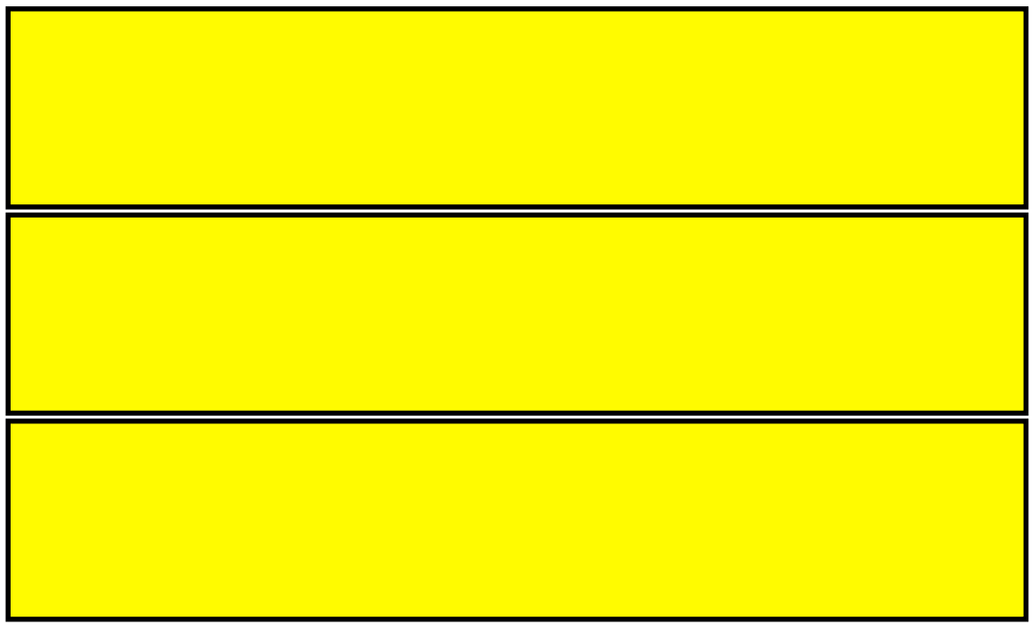
What Is The Same? What's Different?



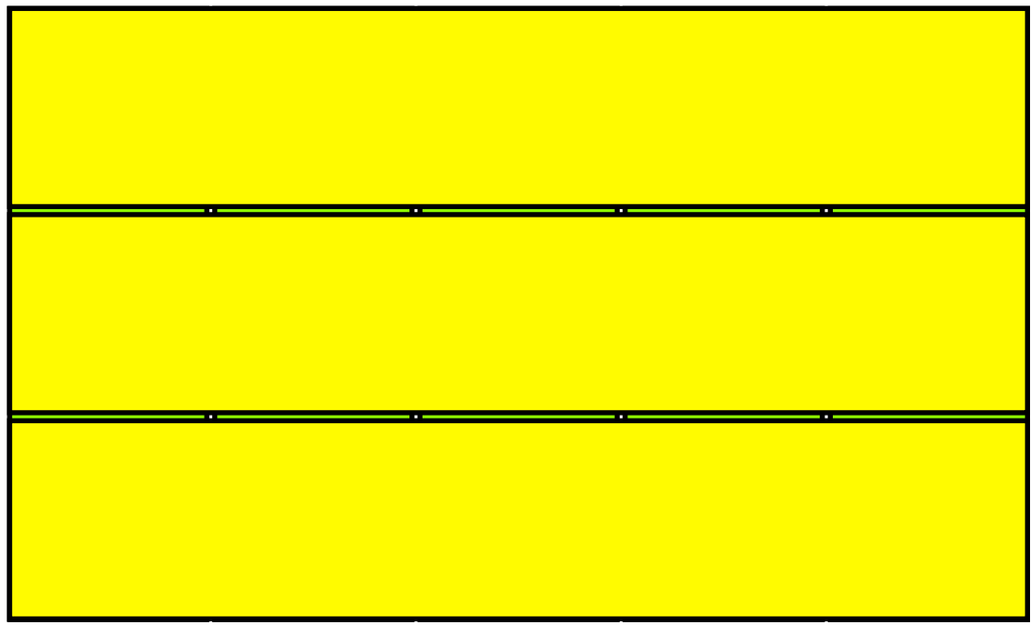


What Is The Same? What's Different?





What Is The Same? What's Different?



$3 \times 5 = 5 \times 3$

commutative property

How Many?

How Many?

$$6(5+2)$$

$$= 6 \times 5 + 6 \times 2$$

$$= 30 + 12$$

$$= 42$$

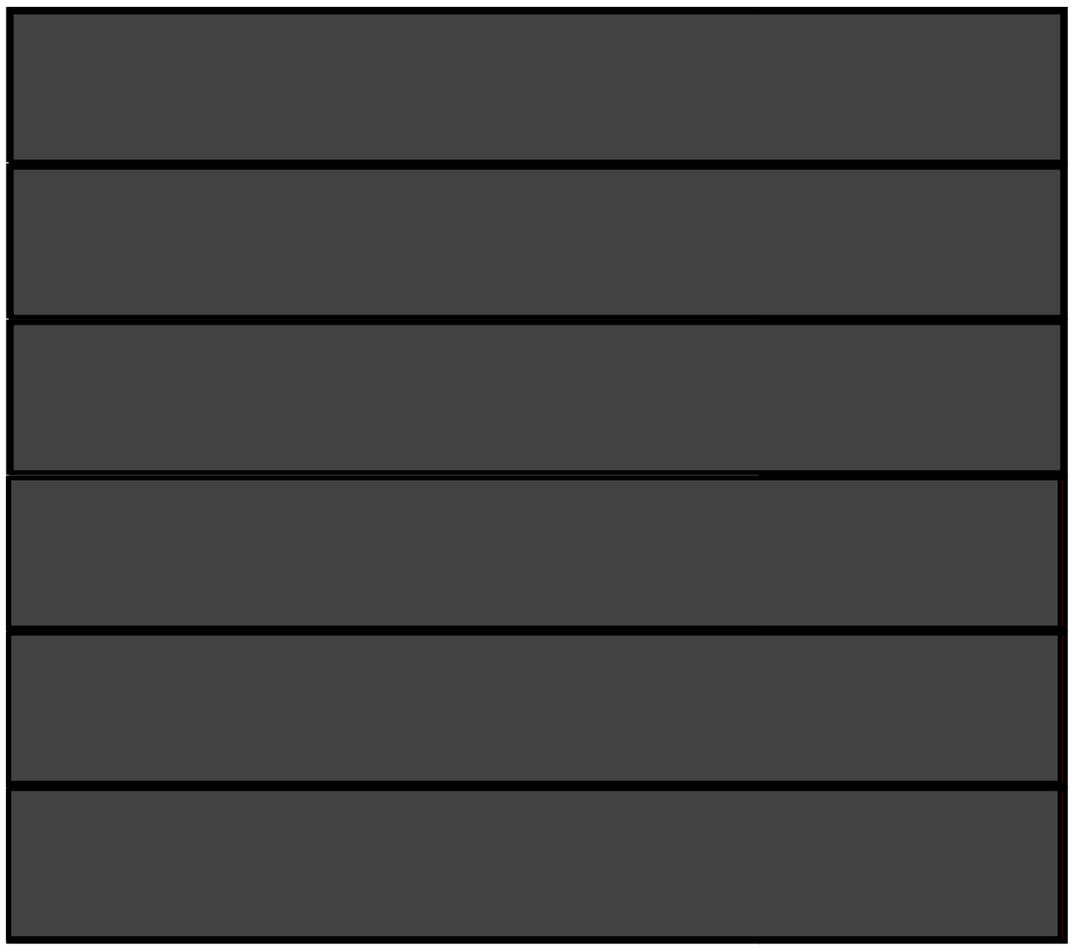
distributive property

$$6(5+2)$$

$$= 6(7)$$

$$= 42$$

How Many?



$6(5+2)$

$= 6(7)$

$= 42$

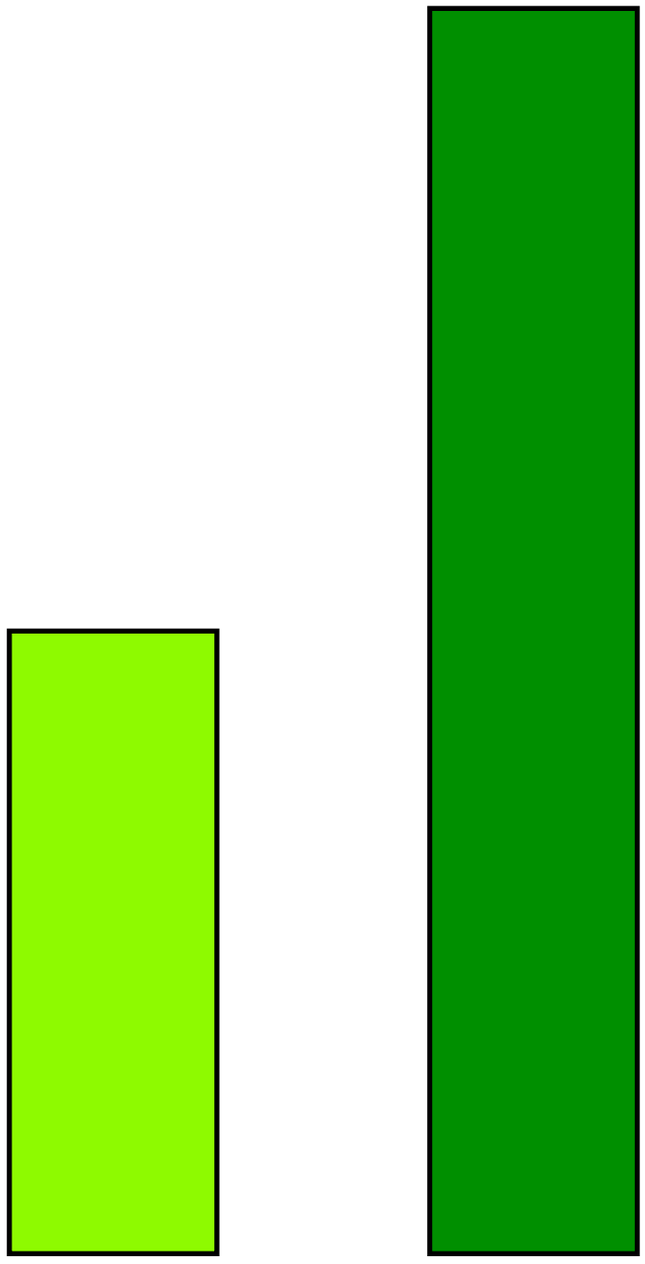
$6(5+2)$

$= 6 \times 5 + 6 \times 2$

$= 30 + 12$

$= 42$

Patterns



. . .

Patterns

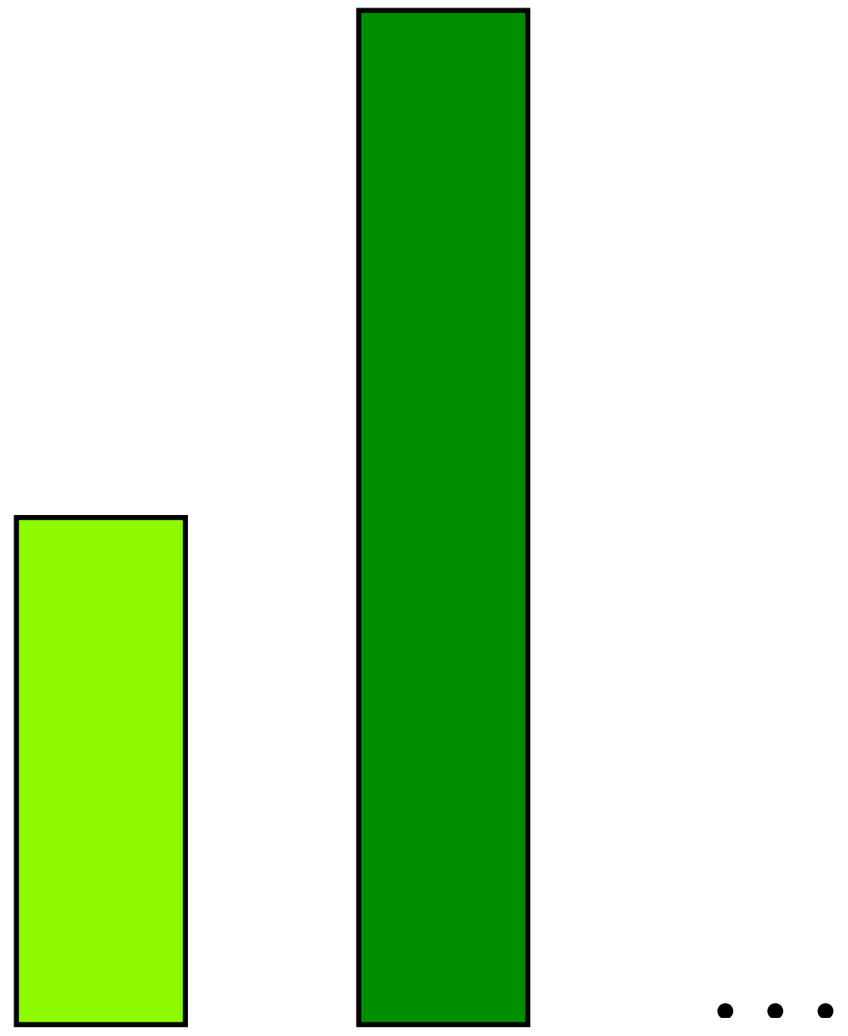
What comes *next*?

What else might come next?

How are these patterns the *same*?
How are they *different*?

What makes a pattern a pattern?

Do all patterns repeat?



What to Look For

Can they…

build a simple repeating pattern?

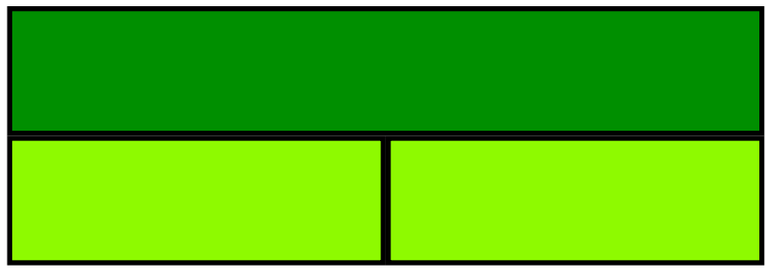
describe their pattern using attributes?

predict what comes next? before?

create more complex patterns?

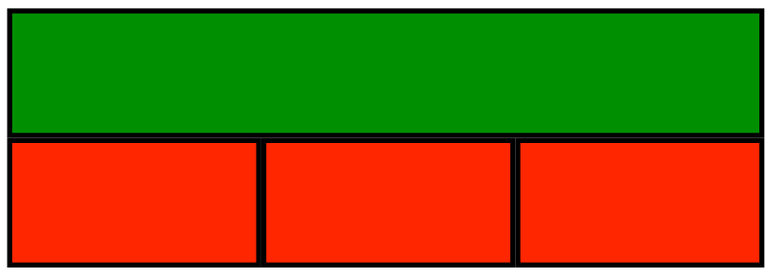
Measurement

If you know a length is 10 **light green** rods long, will it be more or fewer than 10 **dark green** rods long?



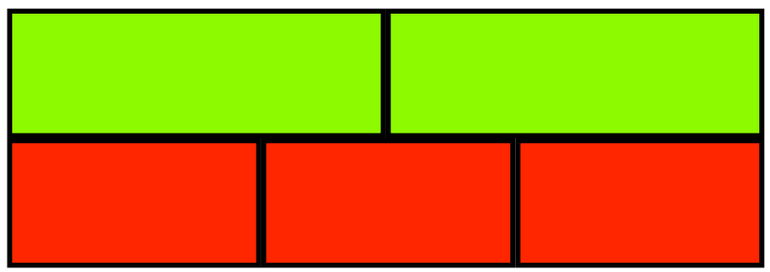
1 dark green = 2 light green

Will it be more or fewer than 10 **red** rods long?



1 dark green = 2 light green

How do you know?



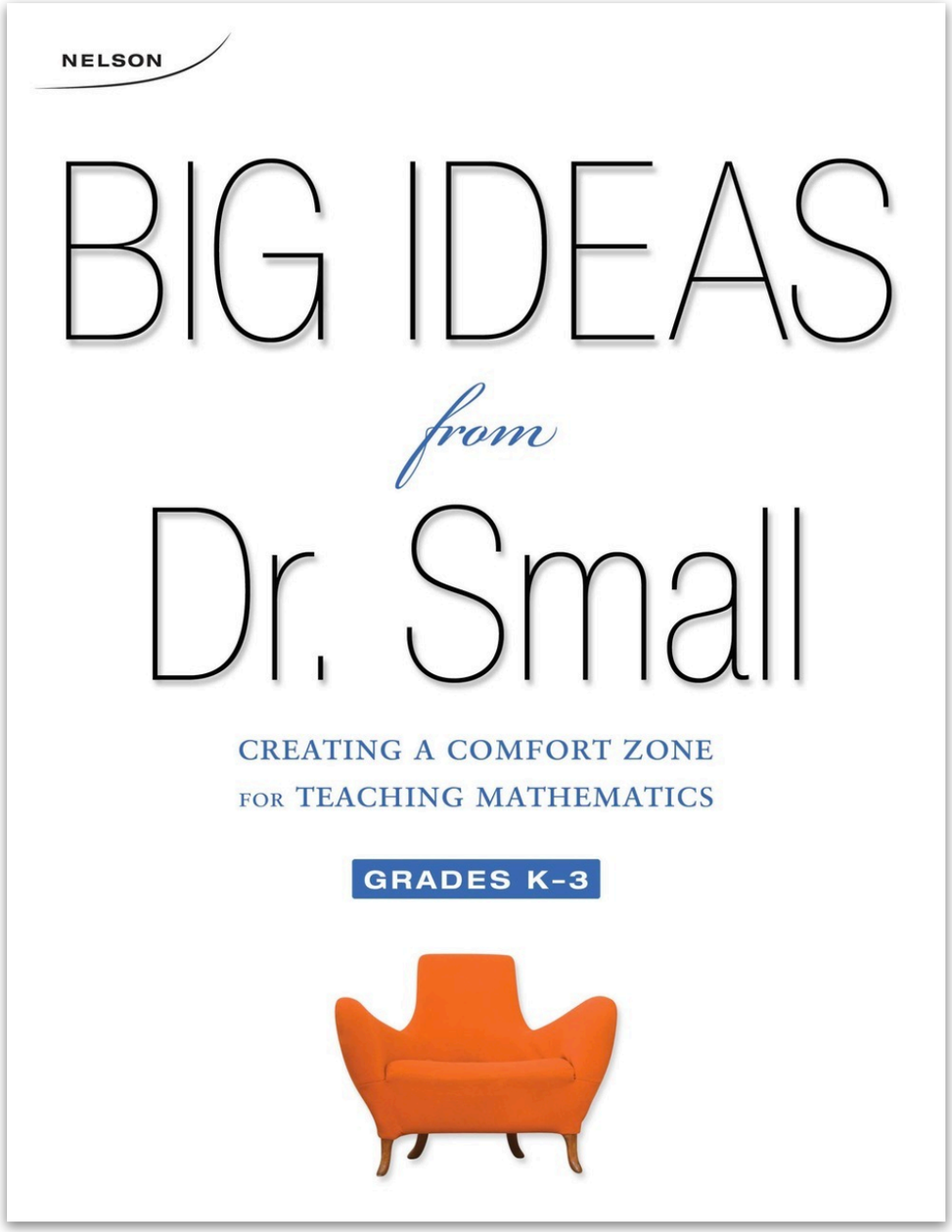
2 dark green = 3 light green

Measurement

Big Ideas for Measurement

- Familiarity with known benchmark measurements can help you estimate and calculate other measurements.

- The unit chosen for measurement affects the numerical value of the measurement; if you use a bigger unit, fewer units are required.



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